

**Preliminary Assessment  
&  
Site Inspection Work Plan  
(Swift Assessment)**

**Empire Canyon**  
Summit County, Utah  
(UT0002005981)



PRELIMINARY ASSESSMENT

**Empire Canyon  
Park City, Utah**  
(UT0002005981)

UTAH DEPARTMENT OF ENVIRONMENTAL QUALITY  
Division of Environmental Response and Remediation  
Prepared by : Jim Thiros

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## 1.0 INTRODUCTION

Under authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) as amended, and in accordance with applicable provisions of the National Oil and Hazardous Substance Pollution Contingency Plan (NCP), the Utah Department of Environmental Quality, Division of Environmental Response and Remediation (DERR) conducted a Preliminary Assessment (PA) of the Empire Canyon (EC) site (UT0002005981) in Park City, Utah. These activities were conducted under a cooperative agreement with the United States Environmental Protection Agency, Region VIII (EPA).

## 2.0 OBJECTIVES

The scope of this Swift Site Investigation includes an on-site reconnaissance, an identification and evaluation of exposure routes, a target survey summary, and the collection of eleven soil/source characterization samples, nine surface water samples, and six sediment samples. Analytical data for municipal ground water sources will be obtained from the Utah Division of Drinking Water. Also included were Quality Assurance and Quality Control (QA/QC) samples. Soil and source samples will be collected to help document observed contamination and to determine if the resident population is exposed to contaminated soils from the historic Empire Canyon mining operations. One background soil sample will be taken, and one trip blank sample will be collected for quality control purposes. All samples will be analyzed for total metals. The Environmental Protection Agency (EPA) Potential Hazardous Waste Site Preliminary Assessment Form and the Preliminary Assessment Work Sheet Form are included as Appendix A.

The major pathways of concern will be identified during this PA/SI (SWIFT) conducted by DERR. Sample collection is necessary to delineate areas of observed contamination, and to determine whether off-site contamination has occurred in the soils, ground water, or surface water. The drinking water supply wells, as well as surface water and sediment of Silver Creek will be evaluated during the sample collection portion of this assessment.

### 3.0 SITE LOCATION, DESCRIPTION AND HISTORY

#### 3.1 Site Location

The EC site located in Empire Canyon just south of Park City. The geographic coordinates for the site are 40°37'40.0" North Latitude and 111°20'05.0" West Longitude (Appendix A). To reach the site, travel east of salt lake City on I-80 to the Kimbal Junction exit. Travel south on State Road 224 to the downtown area of Park City. Turn right onto Empire Canyon Road and travel south into Empire Canyon past the houses until the paved road changes to gravel, this is the north boundary of the site. There were several mills, mines, concentrators, assay office, trams and other mine workings for the next mile up the EC on both sides of the canyon ( Figure 1).

The site is situated on the eastern slope of the Wasatch Range, approximately 25 miles southeast of Salt Lake City. Park City rests at the convergence of Woodside Gulch, and Empire Canyon. These canyons were the main ore producing areas of Park City (Figure 1).

#### 3.2 Site Description

The total surface area of the site is approximately 500 acres. The site is easily accessible, as no fences or signs are present to limit access to the site. The Tour de Suds Mountain Bike Trail goes though the center of the area in question, and terminates at Guardsman Pass. The EC is bounded by mountains on the north, east and south, and a Park City residential area to the north (Figure 2).

The topographic layout of the Park City district lies between the precipitous cliffs and ledges that mark the main crest of the range and the verdant mountain meadows of Heber, Kamas, and Parleys that lie along the its eastern foothills. Park City is near the Weber/Provo divide which is the most prominent spur on the east slope of the central Wasatch, this divide is also the boundary between Summit and Wasatch counties. The immediate area around the site is one of steep canyon walls covered with tailings and mine overburden, which slope directly into Empire Canyon Creek. The terraces or flat spots in the canyon are the locations of the mills assay office, power sub-stations, mills and a municipal drinking water tank. There are several other mills and a smelter located in Park City. The reason for smelters and mills

being located so close to each other in Park City was that there were two grades of ore in the Park City mining district; the higher grade ore went directly to one of the smelters, and the lower grade ores had to be concentrated at the mills before they could be sold or smelted into bars. The Park City mills commonly had slime ponds associated with them, in which were the heavier fine materials would settle out (of the slimers) to collect the fine concentrates from the floatation process at the mill. The flotation was completed by using a mixture of creosote and pine oil to float the lighter density materials to the surface, and the heavier more precious material would sink to the bottom ( Dagget, Ellsworth).

Tailings from the mine operations are located along the canyon slopes as well as in the creek. Several worn trails parallel the creek and traverse the mill, and mine sites. The canyon and the creek are popular areas for residents and visitors to hike and bike. There is a gate across the gravel road up the Empire Canyon ½ mile from the nearest homes, but the mountain bike trail starts at that point. Empire Creek originates approximately one mile to the south near the Summit/Wasatch County line near the Daly West Mine and the Anchor Mine drain tunnel.

### 3.3 Site History

In the fall of 1869 the Little Cottonwood Canyon was being over run by miners and mining claims. A few miners ventured outside the Cottonwoods area east over the divide to the narrow gulches of Parley's Park. The first record of claim in the area was in 1869 by Rufus Walker. The first shipment of ore from the Park City area came in July, 1870, from the Flagstaff Mine (B.S. Butler).

The Thunderer group of claims were originally located in the Empire Canyon in 1898. These claims were soon purchased by William Curtis and John Rhodin in 1901 and consolidated as the American Flag Company. The Flag, as it was known in Park City, had high gold values right from the start. Each ton of ore produced 700 ounces of silver as well as \$100 of gold. The workings consisted of a double drum hoist with two 60-horsepower boilers. The workings of the Flag were to a depth of 1600 feet before they were flooded with cave-in of the Ontario drain tunnel in 1905. The flooded waters filled the Flag to its 600 foot level. Mining resumed at the shallower depths until the drain tunnel was re-opened when the water levels subsided. Shortly thereafter the Daly group of mines acquired the Flag and its mines which now occupied 360 acres. For a few years ore from the Anchor mine was milled at the Union Mill in Empire Canyon, but the Anchor mine soon built its own mill in Empire

Canyon. The Anchor was purchased by the Daly group and became the Daly-Judge (Thompson). The Anchor mine drainage is currently being used as a drinking water supply for Park City (UDDWS). The Union Mill was replaced by a Daly-Judge Mill. The mill was located on the east side of Empire Canyon, on top of the vast tailings piles.

The Mills commonly had to concentrate the ore that was processed at the facility. The early attempts to concentrate the ores were not terribly effective. A floatation process was developed along with a Lixivication process to further concentrate the ore. A more profitable process was developed by Russell, a local from Park City. This new process consisted in (1) matting the sulphides in an iron pot, (2) roasting the pulverized matte in a muffle furnace (a small smelter), (3) dissolving the roasted matte in a dilute sulfuric acid solution, (4) crystallizing from the solution bluestone which is used in the mill for preparing Russell's extra solution, (5) washing the silver residue, pressing it into cakes, and melting the dry cakes into bars. The process of Lixivication and Amalgamation were developed in a building near the Marsac Mill that was owned by McKim Concentrating Machines. These processes were patented in February 15, 1876 (B.S. Butler).

#### 4.0 POTENTIAL EXPOSURE PATHWAYS:

##### 4.1 WASTE/SOURCE CHARACTERISTICS

The immediate area around the site is one of multiple terraces and steep mountain slopes that tilt towards Empire Creek. The terraces are slightly sloping towards the creek that flows to the city center and Silver Creek. A number of large mills were located in Empire Canyon. Three large mines and mills were located in the canyon as well as several smaller operations between the more substantial sites. The larger mines include; Daly-West, American Flag (Daly- Judge), and the Anchor mines. At the Anchor and the Daly-West mines there is evidence of slag material being on-site from the ore roasting process. There may have also been small smelters located at the larger mills. The Park City mills commonly had slime ponds associated with them, where the heavier fine materials would settle out of the slime, to collect the fine concentrates from the floatation process at the mill. The floatation was completed by using a mixture of creosote and pine oil to float the lighter density materials to the surface, and the heavier more precious material would sink to the bottom (Dagget, Ellsworth, 1888).

Upon the first terrace on the west side of the canyon, stands a mine operations shop for the Daly-Judge Mine, site of the historic American Flag Mine. Within the shop there are substantial amounts of mining equipment, nuts and bolts, and a few old transformers. Upon inspection of the transformers there was no evidence that they were PCB free. The transformers seem to be in good shape and not leaking, but they are not standing vertically. One could assume that the transformers have not been checked for PCB's, and should be treated as if they contained PCB's until analysis of the transformers proves other wise.

The possibility of heavy metals contamination around the EC mines is significant, due to the nature of the operations and the historic waste practices that were common in early mining camps. The chances of any volatile organics, from the floatation process, remaining in the wastes after 80 years are low.

## 4.2 GROUND WATER PATHWAY

### 4.2.1 Hydrogeologic Setting

Ground water at the site occurs in unconsolidated valley fill and consolidated rocks. The unconsolidated valley fill consists of poorly sorted cobbles, gravel, sand, silt, and clay of alluvial origin. The thickness of the unconsolidated valley fill near the site varies from a few feet near the outcrops of consolidated rock to 260 feet at the Pacific Bridge well located near Prospector Square. It is suspected that ground water flows in the same general path as surface water in the area. Therefore ground water would flow towards Empire Creek then towards Silver Creek in a northwesterly direction through the Park City area. It is also suspected that ground water in the canyon is several feet below the fill in the bottom of the canyon (Prospector Square SI). The Utah Division of Drinking Water has confirmed that elevated levels of arsenic have been identified in the Park City drinking water system. The sampling data from the Judge Tunnel (a.k.a. Anchor Drainage Tunnel) indicates that arsenic levels at 8 ppb, cadmium 2 ppb, antimony 7 ppb, and lead at 9 ppb.

### 4.2.2 Ground Water Targets

The nearest municipal ground water wells in the vicinity of EC are the municipal water wells that are on-site. The two drinking water sources on-site that receive water from the Anchor

Mine drainage tunnel, which is located in the north portion of EC. There are an additional two more municipal water wells in Thaynes Canyon two miles away. Ground water to surface water migration of contaminants from the site are also possible. Appendix C shows the locations of the 15 public drinking water wells within four miles of EC site (UDDWS, 1991).

#### 4.2.3 Ground Water Conclusions

The EC site is located in an area of concern for groundwater contamination. Because of the proximity of the EC operations to the local public drinking water wells (Anchor Mine drainage tunnel), there is a potential for contamination from the site to adversely affect human health and the environment.

### 4.3 SURFACE WATER PATHWAYS

#### 4.3.1 Hydrologic Setting

The topographic layout of the site and immediate area is multiple terraces and steep mountain slopes. The terraces are generally sloping towards Empire Creek. The creek is immediately adjacent to the mine waste sites in the canyon bottom. Water generally flows down the creek in the spring and early summer months; water also flows down the creek during summer storm events. Run-off from the site flow directly into Empire Creek or soaks into the soil adjacent to the creek. It is unclear how much upgradient run-on water would flow across the site, but the upgradient drainage that could potentially run over the site is in the 1000's of acres.

Empire Creek flows though the site and joins up with Silver creek 3/4 of one mile below the site in Park City. Downgradient of the EC site there are currently 16 Points of Diversion (POD) (Division of Water Rights data base). All POD's have a current designation for irrigation water. At the time of this report there are no known POD's in Silver Creek that have been designated for drinking water purposes.

#### 4.3.2 Surface Water Targets

There are a number of targets downgradient of the site and adjacent to the site. These targets

include; wetlands along Silver Creek, children playing in the water in Empire Creek as well as in Silver Creek, residents that use Silver Creek as an irrigation source, and Silver Creeks contribution to the Weber River, which is a blue-water fishery for trout, and whitefish. The drinking water for the Park City area is from ground water sources and from mine drainage tunnels. There are no known downgradient surface water drinking water sources coming from Silver Creek. There are approximately 7 miles of wetland frontage along the 15 mile downgradient migration pathway of Silver Creek and the Weber River (National Wetland Maps).

#### 4.3.3 Surface Water Conclusions

The surface water pathway poses a significant threat to human health and the environment at the EC site, due to its proximity to surface water bodies in the area. The site may also contaminate local wetlands by its release of hazardous waste to the ground water which may then resurface in one of the many springs in the area, via the ground water to surface water pathway. Contaminants that enter into the Empire Creek would migrate to Silver Creek and then pass through the Park City tourist district and to the Prospector Square area of the city. The Prospector Square area includes businesses, homes and three schools. The three schools had approximately 2200 students that attended on a daily basis during the 1996 school year (Hall). Based on the available information, the EC site may pose a significant threat to the surface water pathway.

### 4.4 SOIL EXPOSURE PATHWAY

#### 4.4.1 Physical Conditions

The 500 acre site is in an area that is not currently developed, but the property owners are attempting to re-zone the property for residential dwellings. The holdup on the development at this time is access to the site through the narrow residential road in Empire Canyon. The canyon has steep sides that slope directly into Empire Creek. Most of the area in the canyon that is affected by mine waste is devoid of vegetation. Soils in the immediate area of the mills are discolored with a yellow/orange tint that is nontypical to other soils in the area. The mine tailings There are small amounts of slag at the Anchor and Daly west mines. This slag material may have come from the ore roasting and casting processes at the on-site mills. Many small milling/refining areas were noticed in the Empire canyon wash, tailings in the

wash ranged from a couple of inches thick to 6 feet thick. Source/soils range in size from small cobble-sized rocks to very fine silts.

#### 4.4.2 Soil Targets

Direct exposure to soil contaminated with heavy metals is a pathway of concern. Heavy metals are not only contained within the slag and tailings located on-site, but may also have been released off-site by emissions from the smoke stacks, muffle furnaces, spilling of pregnant sulfuric acid solution, acid air emissions, and un-processed ore. Based on 1990 Census data, there are 4,687 persons living within a four mile radius of the EC site (Appendix B). It is not known how many people use the foot trail, and mountain biking trail that traverse the site. Tails are located in the canyon though its entire length from the Anchor mine to where the Empire Creek goes under ground just south of the nearest residential homes.

Soils in the immediate area of the mills are discolored with a yellow/orange tint that is not typical of other soils in the area. There are small amounts of slag scattered about the Anchor and Daly-West upper terrace of the site, this slag material may have come from the ore roasting and casting processes or from the nearby Park City Smelter. Soils range in size from small cobble sized rocks to very fine silts. There are very few restraints to keep unauthorized people off the site. There are also several gravel parking lots located on-site.

**Table 1**  
Population within a Four-Mile Radius of  
Empire Canyon (Park City)

Distance (Miles)	Population
0 - 1/4	0
1/4 - 1/2	0
1/2 - 1	173
1 - 2	1,398
2 - 3	3,016
3 - 4	4,687

(Summary of Appendix C).

A number of visitors also come to the site since it is a historic mining town and there is interest in the old mining structures and the activities associated with them, and there may also be occasional artifact hunters looking for mining artifacts on the site.

#### 4.4.3 Soil Exposure Conclusions

Based on the results of other mill site investigations in the State of Utah, elevated levels of heavy metals are likely present at EC. Heavy metal contamination is generally higher in near surface soils, but pockets of high contamination could be present at depths of five to six feet below ground surface if they have been mobilized by the caustic material that was used at the site. Potential heavy metal concentrations at the site could have also come from stack emissions from the mill operations. The site is not fenced and is in an area that is frequently visited by area residents and visitors. According to the 1990 Census data, there are no people residing within 1/4 mile of the site. The people who are most likely to come in to contact with potential contamination on or from the site are the people who recreate in the area as well and residents who occupy the homes which are closest to the historic mining operations. Based on the available information, the soil exposure pathway appears to pose a significant threat at the Empire Canyon site.

### 4.5 AIR PATHWAY

#### 4.5.1 Physical Conditions

Wind conditions vary for the site depending on the time of year and direction of storm fronts. In Utah the direction of the prevailing winds varies considerably with the latitude and the topography. In general, the most frequent prevailing winds are from south to north during the warmer months and from north to south during the colder months. Small particles of heavy metals from stack emissions of the mill may be more mobile than slag material. At the present time, most of the exposed soil in Empire Canyon is devoid of any vegetation or surface covering that would prevent the entrainment of fine dust particles into the air. The movement of vehicles and general operations at the site could create dust that could be entrained into the atmosphere.

#### 4.5.2 Air Targets

Targets for air borne contamination from the site include residents, workers and school children within 1/4 mile of the site. According to 1990 Census Blocks, 4,687 people live within 4 miles of the site which could become targets for exposure to contaminants from the site (Appendix C). People within 1/4 mile of the site have the greatest potential for exposure to airborne contaminants that originate from the site.

#### 4.5.3 Air Exposure Conclusions

A release to air of metal-laden dust is possible given the right climatic conditions and day-to-day activities at the mill site. Exposure risks to individuals at this time does not seem to be significant. But further development of the area could change the air exposure risks at the site.

### 5.0 SUMMARY AND CONCLUSIONS

The Empire Canyon mining operations started in the 1870's and continued into the early 1970's. Waste management practices by early mining companies prior to the implementation of environmental laws were generally poor. In the case of the EC mines, most of the waste material was dumped on-site or went into the Empire Creek, where it flows towards the city of Park City and Silver Creek. Contaminants from the site may potentially affect drinking water sources or may affect nearby wetlands or surface water bodies which could adversely affect livestock and wildlife. On-site soil contamination may also be affecting the health of the downstream residents and recreationists that use the site. Heavy metals, are most likely to be the major contaminants in the on-site soils. Groundwater contamination is also suspected due to the shallow depth of the shallow ground water. Toxic metals absorbed or adsorbed to fine-grained particles may be biologically available to organisms in the soil and water, and thus are available to organisms up the food chain. The air exposure pathway may also pose a threat to human health and the environment.

## 6.0 REFERENCES

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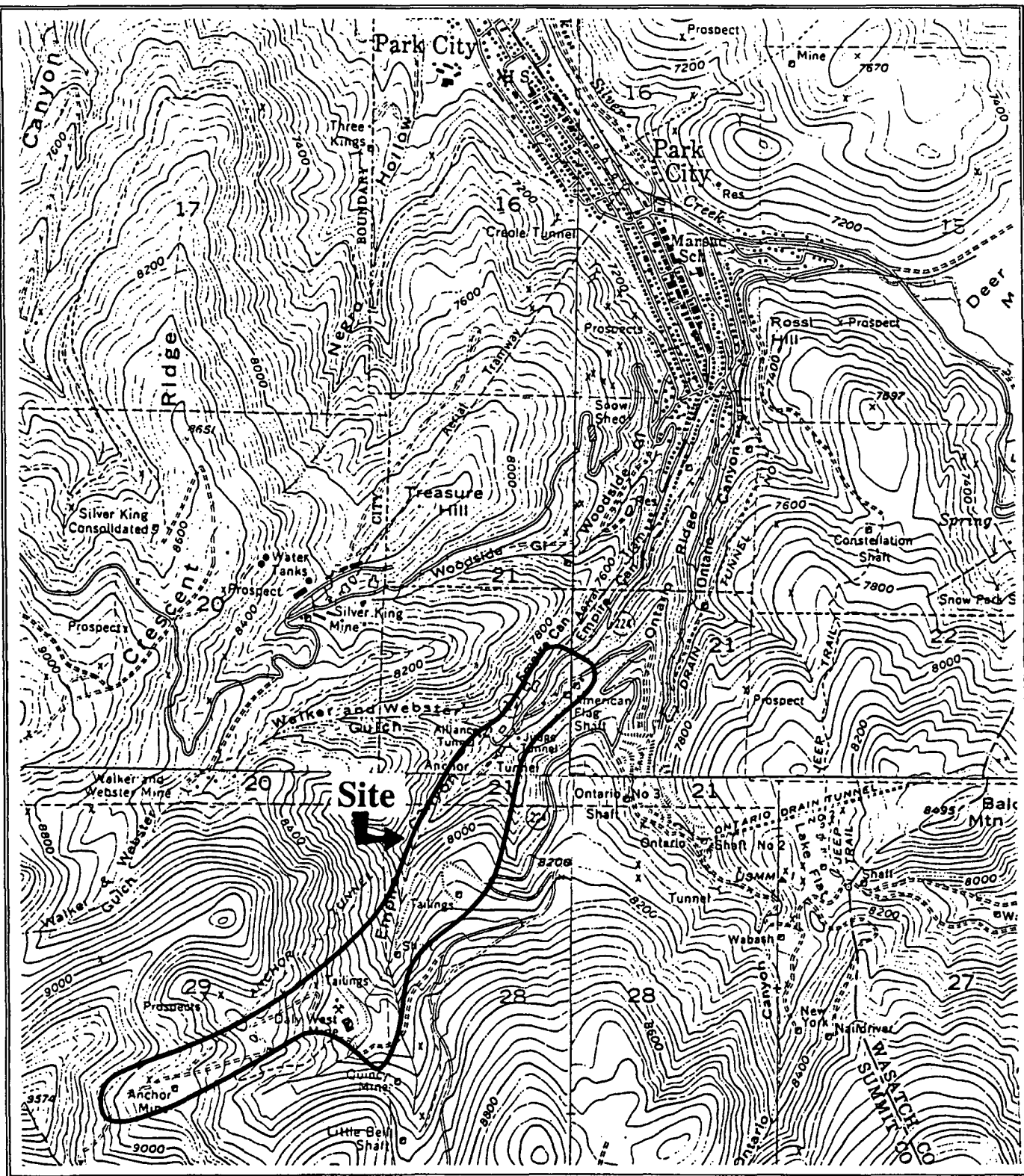
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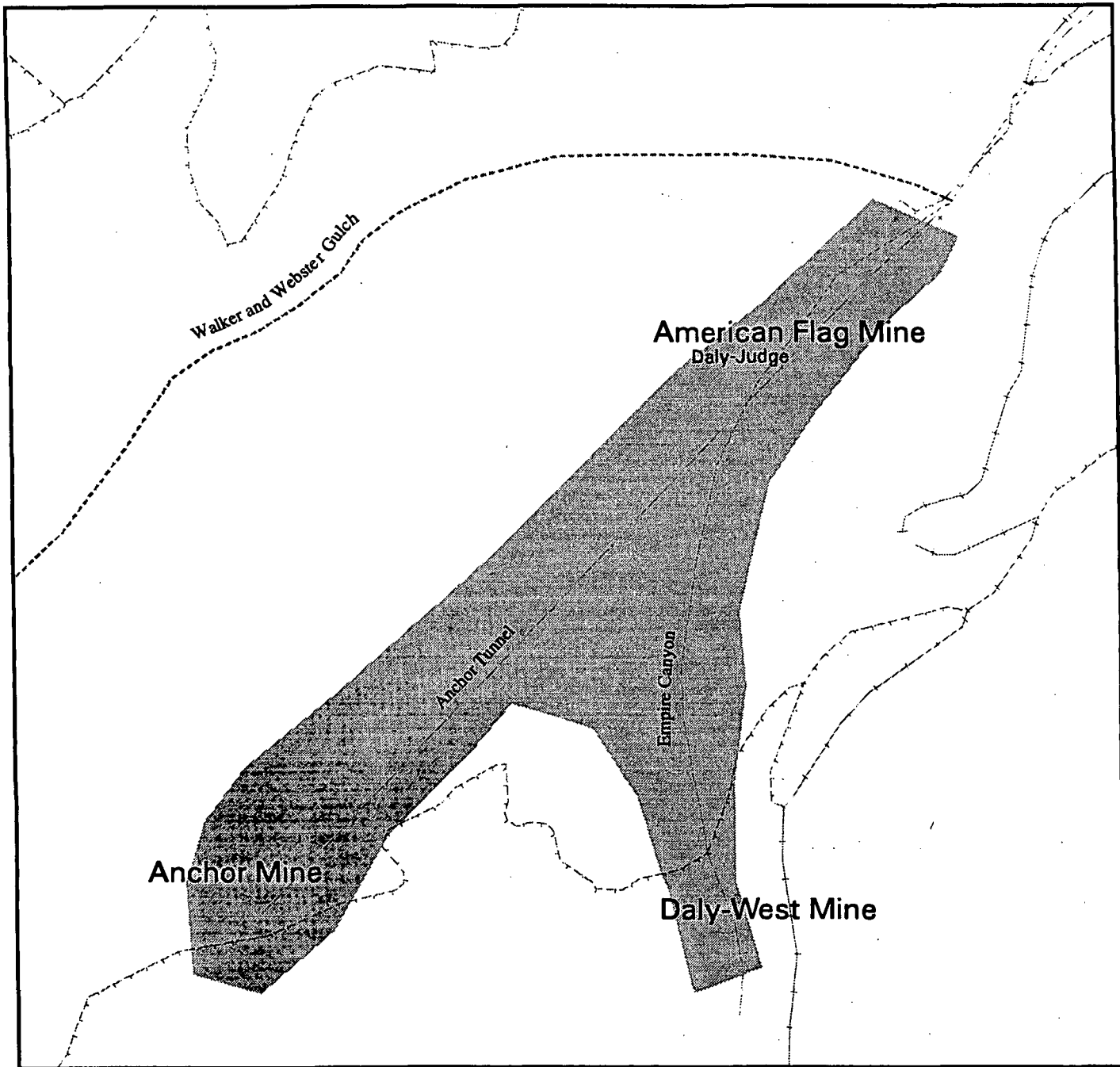
— Site  
 USGS 7.5 Quads  
 Brighton, Utah  
 Heber City, Utah  
 Park City East, Utah  
 Park City West, Utah

North



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Empire Canyon  
 FIGURE # 1  
 Area Map



## Empire Canyon Site Map

### Legend

Counties

empire

Drinking Water Sources -CO100

Stream

Perennial stream

Intermittent stream

Braided Stream

Perennial canal

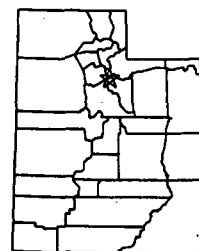
US Highway

County Road

City Street

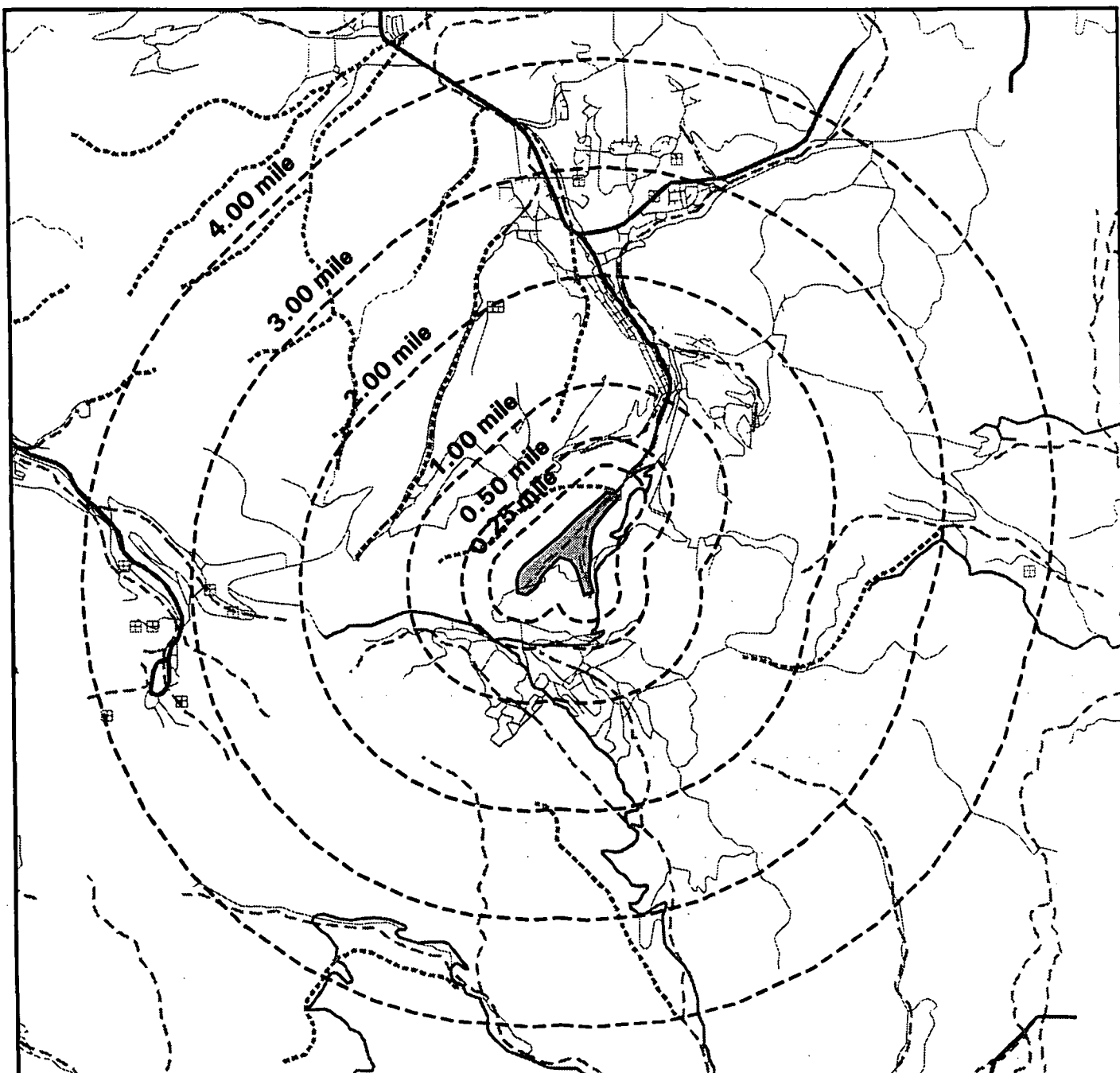
Approximate Scale

1" = 0.18 Miles



UDEQ

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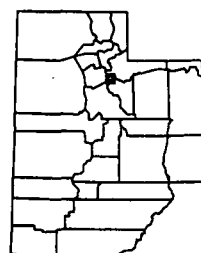


## Empire Canyon Public Drinking Water Wells

### Legend

- |                        |                     |
|------------------------|---------------------|
| Empire Canyon          | Jeep Road           |
| Drinking Water Sources | Perennial stream    |
| US Highway             | Intermittent stream |
| County Road            | Braided stream      |
| City Street            | c_site_bands        |

Approximate Scale  
1" = 1.41 Miles



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**APPENDIX A.**  
**EPA Potential Hazardous Waste Preliminary Assessment Form**

<b>POTENTIAL HAZARDOUS WASTE SITE</b>  <b>PRELIMINARY ASSESSMENT FORM</b>		<b>IDENTIFICATION</b>	
		State:	CERCLIS Number: UT0002005981
		CERCLIS Discovery Date: November 1996	
<b>1. GENERAL SITE INFORMATION:</b>			
Name: Empire Canyon		Street Address: Empire Canyon	
City: Park City		State: Utah	Zip Code 84060
County: Summit	County Code:	Congressional District: 01	
Latitude: 40 ° 37 ' 40 "		Status of Site:  <input type="checkbox"/> Active <input checked="" type="checkbox"/> Inactive <input type="checkbox"/> Not Specified <input type="checkbox"/> Not Applicable	
Longitude: 111 ° 30 ' 05 "			
Approximate Area of Site:			
500 Acres      Square Feet			
<b>2. OWNER/OPERATOR INFORMATION</b>			
Owner: United Park City Mines		Operator: Same	
Street Address: Ontario Canyon		Street Address:	
City: Park City		City:	
State: Utah	Zip Code: 84060	State:	Zip Code:
Telephone: (801) 649-6505		Telephone:	
Type of Ownership: <input checked="" type="checkbox"/> Private <input type="checkbox"/> State <input type="checkbox"/> Municipal <input type="checkbox"/> Indian <input type="checkbox"/> County <input type="checkbox"/> Not Specified <input type="checkbox"/> Federal Agency <input type="checkbox"/> Other		How Initially Identified: <input type="checkbox"/> Citizen Complaint <input type="checkbox"/> RARA/CERCLA <input type="checkbox"/> PA Petition <input type="checkbox"/> Notification <input checked="" type="checkbox"/> State/Local Program <input type="checkbox"/> Not Specified <input type="checkbox"/> Incidental <input type="checkbox"/> Other <input type="checkbox"/> Federal Program	
<b>3. SITE EVALUATOR INFORMATION</b>			
Name of Evaluator: Jim Thiros		Agency/Organization: UDEQ	Date: 09/16/97
Street Address: 168 N 1950 W		City: Salt Lake City	State: Utah
Name of EPA or State Agency Contact: Steve Thirirot		Telephone: (801) 536-4100	
Street Address: 168 N 1950 W		City: Salt Lake City	State: Utah
<b>4. SITE DISPOSITION (for EPA use only)</b>			
Emergency Response/Removal Assessment Recommendation:  <input type="checkbox"/> Yes <input type="checkbox"/> No  Date:    /    /		CERCLIS Recommendation:  <input type="checkbox"/> Higher Priority SI <input type="checkbox"/> Lower Priority SI <input type="checkbox"/> NFRAP <input type="checkbox"/> RARA <input type="checkbox"/> Other:	Signature:  Name (typed):  Position:

**POTENTIAL HAZARDOUS WASTE SITE  
PRELIMINARY ASSESSMENT FORM - PAGE 2 OF 4**

CERCLIS Number

**5. GENERAL SITE CHARACTERISTICS**

**Predominant Land Uses Within 1 Mile of Site:**

<input type="checkbox"/> Industrial	<input type="checkbox"/> Mining	<input type="checkbox"/> DOE
<input type="checkbox"/> Commercial	<input type="checkbox"/> DOD	<input type="checkbox"/> DOI
<input type="checkbox"/> Residential	<input type="checkbox"/> Other Federal Agency	
<input checked="" type="checkbox"/> Forest/Fields		
<input type="checkbox"/> Agriculture	<input type="checkbox"/> Other	

**Site Setting:**

☐ Urban  
☐ Suburban  
☒ Rural

**Years of Operation:**

Beginning Year: 1880  
 Ending Year: 1970's  
 Unknown:     

**Type of Operations (check all that apply):**

<input type="checkbox"/> Manufacturing	<input type="checkbox"/> Retail
<input type="checkbox"/> Lumber and Wood Products	<input type="checkbox"/> Recycling
<input type="checkbox"/> Inorganic Chemicals	<input type="checkbox"/> Junk/Salvage Yard
<input type="checkbox"/> Plastic and/or Rubber Products	<input type="checkbox"/> Municipal Landfill
<input type="checkbox"/> Paints, Varnishes	<input type="checkbox"/> Other Landfill
<input type="checkbox"/> Industrial Organic Chemicals	<input type="checkbox"/> DOD
<input type="checkbox"/> Agricultural Chemicals	<input type="checkbox"/> DOE
(e.g. Pesticides, fertilizers)	<input type="checkbox"/> DOI
<input type="checkbox"/> Miscellaneous Chemical Products	<input type="checkbox"/> Other Federal Facility
<input type="checkbox"/> Primary Metals	<input type="checkbox"/> RARA
<input type="checkbox"/> Metal Forging, Stamping	or Disposal Facility
<input type="checkbox"/> Fabricated Struct. Metal Products	<input type="checkbox"/> Large Quantity Gen.
<input type="checkbox"/> Electronic Equipment	<input type="checkbox"/> Small Quantity Gen.
<input type="checkbox"/> Other Manufacturing	<input type="checkbox"/> Subtitle D
<input checked="" type="checkbox"/> Mining	<input type="checkbox"/> Municipal
<input checked="" type="checkbox"/> Metals	<input type="checkbox"/> Industrial
<input type="checkbox"/> Coal	<input type="checkbox"/> "Converter"
<input type="checkbox"/> Oil and Gas	<input type="checkbox"/> "Protective Filer"
<input type="checkbox"/> Non-Metallic Metals	<input type="checkbox"/> "Non or Late Filer"
<input type="checkbox"/> Not Specified	
<input type="checkbox"/> Other: <u>                    </u>	

**Waste Generated:**

☐ Onsite  
☐ Offsite  
☐ Onsite and Offsite  
☐ Unknown

**Waste Deposition  
Authorized By:**

☐ Present Owner  
☐ Former Owner  
☐ Present and Former Owner  
☐ Unauthorized  
☐ Unknown

**Waste Accessible to  
the Public:**

☐ Yes  
☐ No

**Distance to Nearest  
Dwelling, School, or  
Workplace:**

                     Feet

**6. WASTE CHARACTERISTICS INFORMATION**

**SOURCE TYPE:**

**SOURCE WASTE**

**General Types of Waste**

(Check all that apply)

**QUANTITY**  
(Include Units)      **TIER**

(Check all that Apply):

<input type="checkbox"/> Landfill	<u>                    </u>	<u>    </u>
<input checked="" type="checkbox"/> Surface Impoundment	<u>                    </u>	<u>    </u>
<input type="checkbox"/> Drums	<u>                    </u>	<u>    </u>
<input type="checkbox"/> Tanks and Non-Drum Containers	<u>                    </u>	<u>    </u>
<input type="checkbox"/> Chemical Waste Pile	<u>                    </u>	<u>    </u>
<input type="checkbox"/> Scrap Metal or Junk Pile	<u>                    </u>	<u>    </u>
<input checked="" type="checkbox"/> Tailings Pile	<u>                    </u>	<u>    </u>
<input checked="" type="checkbox"/> Trash Pile (Open Dump)	<u>                    </u>	<u>    </u>
<input type="checkbox"/> Land Treatment	<u>                    </u>	<u>    </u>
<input checked="" type="checkbox"/> Contaminated Ground	<u>                    </u>	<u>    </u>
Water Plume		
(Unidentified Source)		
Contaminated Surface	<u>                    </u>	<u>    </u>
Water/Sediment		
(Unidentified Source)		
Contaminated Soil	<u>                    </u>	<u>    </u>
Other	<u>                    </u>	<u>    </u>
No Sources	<u>                    </u>	<u>    </u>

☒ Metals  
☐ Organics  
☒ Inorganics  
☐ Solvents  
☐ Paints/Pigments  
☐ Laboratory/Hospital Waste  
☐ Radioactive Waste  
☐ Oily Waste  
☐ Pesticides/Herbicides  
☒ Acids/Bases  
☐ Construction/Demolition Waste  
☐ Municipal Waste  
☒ Mining Waste  
☐ Explosives  
☐ Other:                     

**Physical State of  
Waste as Deposited  
(Check all that Apply):**

<input type="checkbox"/> Solid	<input type="checkbox"/> Gas
<input type="checkbox"/> Liquid	<input type="checkbox"/> Powder
<input type="checkbox"/> Sludge	

\* C = Constituent, W = Wastestream,  
 V = Volume, A = Area

**POTENTIAL HAZARDOUS WASTE SITE  
PRELIMINARY ASSESSMENT FORM - PAGE 3 OF 4**

CERCLIS Number \_\_\_\_\_

**7. GROUND WATER PATHWAY**

<p>Is the Ground Water Used for Drinking Water Within 4 Miles:</p> <p align="center"><input checked="" type="checkbox"/> Yes      <input type="checkbox"/> No</p> <p>Type of Drinking Water Wells Within 4 Miles (Check all that apply):</p> <p><input checked="" type="checkbox"/> Municipal</p> <p><input type="checkbox"/> Private</p>	<p>Is There a Suspected Release</p> <p>Have Primary Target Drinking Water Wells Been Identified:</p> <p align="center"><input checked="" type="checkbox"/> Yes      <input type="checkbox"/> No</p> <p>If Yes, Enter Primary Target Population:</p> <p align="center"><u>6500</u> People</p>	<p>List Secondary Target Population Served by Ground Water Withdrawn From:</p> <p>0-¼ Mile _____</p> <p>&gt;¼-½ Mile _____</p> <p>&gt;½-1 Mile _____</p> <p>&gt;1-2 Miles _____</p> <p>&gt;2-3 Miles _____</p> <p>&gt;3-4 Miles _____</p> <p>Total Within 4 Miles <u>4687</u></p>
<p>Depth to <del>Surface</del> <sup>Nearest</sup> Flowest Aquifer:</p> <p align="center"><u>10</u> Feet</p> <p>Karst Terrain/Aquifer Present:</p> <p align="center"><input type="checkbox"/> Yes      <input checked="" type="checkbox"/> No</p>	<p>Nearest Designated Wellhead Protection Area:</p> <p><input checked="" type="checkbox"/> 0 - ¼ Mile</p> <p><input type="checkbox"/> &gt; ¼ - 4 Miles</p> <p><input type="checkbox"/> None Within 4 Miles</p>	

**8. SURFACE WATER PATHWAY**

<p>Type of Surface Water Draining Site and 15 Miles Downstream (Check all that Apply):</p> <p><input checked="" type="checkbox"/> Stream    <input type="checkbox"/> River    <input type="checkbox"/> Pond    <input type="checkbox"/> Lake</p> <p><input type="checkbox"/> Bay      <input type="checkbox"/> Ocean    <input type="checkbox"/> Other _____</p>	<p>Shortest Overland Distance From Any Source to Surface Water:</p> <p align="center"><u>0</u> Feet      _____ Miles</p>																					
<p>Is There a Suspected Release to Surface Water:</p> <p align="center"><input checked="" type="checkbox"/> Yes      <input type="checkbox"/> No</p>	<p>Site is Located In</p> <p><input checked="" type="checkbox"/> Annual - 10 yr Floodplain</p> <p><input type="checkbox"/> &gt; 10 yr - 100 yr Floodplain</p> <p><input type="checkbox"/> &gt; 100 yr - 500 yr Floodplain</p> <p><input type="checkbox"/> &gt; 500 yr Floodplain</p>																					
<p>Drinking Water Intakes Located Along the Surface Water Migration Path:</p> <p align="center"><input type="checkbox"/> Yes      <input checked="" type="checkbox"/> No</p>	<p>Have Primary Target Drinking Water Intakes Been Identified:</p> <p align="center"><input type="checkbox"/> Yes      <input checked="" type="checkbox"/> No</p>	<p>If Yes, Enter Population Served by Primary Target Intakes:</p> <p align="center">_____ People</p>																				
<p>List All Secondary Target Drinking Water Intakes:</p> <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:30%; text-align: center;">Name</th> <th style="width:30%; text-align: center;">Water Body</th> <th style="width:20%; text-align: center;">Flow (cfs)</th> <th style="width:20%; text-align: center;">Population Served</th> </tr> </thead> <tbody> <tr> <td align="center">None</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>_____</td> <td>_____</td> <td>_____</td> <td>_____</td> </tr> </tbody> </table> <p align="right">Total Within 15 Miles _____</p>			Name	Water Body	Flow (cfs)	Population Served	None	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
Name	Water Body	Flow (cfs)	Population Served																			
None	_____	_____	_____																			
_____	_____	_____	_____																			
_____	_____	_____	_____																			
_____	_____	_____	_____																			
<p>Fisheries Located Along the Surface Water Migration Path:</p> <p align="center"><input checked="" type="checkbox"/> Yes      <input type="checkbox"/> No</p>	<p>Have Primary Target Fisheries Been Identified:</p> <p align="center"><input type="checkbox"/> Yes      <input checked="" type="checkbox"/> No</p>																					
<p>List All Secondary Target Fisheries:</p> <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:70%; text-align: center;">Water Body / Fishery Name</th> <th style="width:30%; text-align: center;">Flow (cfs)</th> </tr> </thead> <tbody> <tr> <td><u>Weber River</u></td> <td align="center"><u>100</u></td> </tr> <tr> <td>_____</td> <td>_____</td> </tr> <tr> <td>_____</td> <td>_____</td> </tr> <tr> <td>_____</td> <td>_____</td> </tr> </tbody> </table>			Water Body / Fishery Name	Flow (cfs)	<u>Weber River</u>	<u>100</u>	_____	_____	_____	_____	_____	_____										
Water Body / Fishery Name	Flow (cfs)																					
<u>Weber River</u>	<u>100</u>																					
_____	_____																					
_____	_____																					
_____	_____																					

**POTENTIAL HAZARDOUS WASTE SITE  
PRELIMINARY ASSESSMENT FORM - PAGE 4 OF 4**

CERCLIS Number

**8. SURFACE WATER PATHWAY (continued)**

Wetlands Located Along the Surface Water Migration Path:

☐ Yes ☐ No

Have Primary Target Wetlands Been Identified:

☐ Yes ☐ No

List Secondary Target Wetlands:

Water Body

Flow (cfs)

Frontage Miles

Other Sensitive Environments Located along the Surface Water Migration Path:

☐ Yes ☐ No

Have Primary Target Sensitive Environments Been Identified:

☐ Yes ☐ No

List Secondary Target Sensitive Environments:

Water Body

Flow (cfs)

Sensitive Environment Type

**9. SOIL EXPOSURE PATHWAY**

Are People Occupying Residences or Attending School or Day Care Within 200 Feet of Areas of Known or Suspected Contamination:

☒ Yes ☐ No

Number of Workers Onsite:

☒ None  
☐ 1 - 100  
☐ 101 - 1,000  
☐ > 1,000

If Yes, Enter Total Resident Population:

30 People

Have Terrestrial Sensitive Environments Been Identified on or Within 200 Feet of Areas of Known or Suspected Contamination:

☐ Yes ☒ No

If Yes, List Each Terrestrial Sensitive Environment:

**10. AIR PATHWAY**

Is There a Suspected Release to Air:

☐ Yes ☒ No

Enter total Population on or within:

Onsite 0

0 - ¼ Mile 0

> ¼ - ½ Mile 0

> ½ - 1 Mile 173

> 1 - 2 Miles 1,398

> 2 - 3 Miles 3,016

> 3 - 4 Miles 4,687

Total Within

4 Miles: 9,264

Wetlands Located Within 4 Miles of the Site:

☒ Yes ☐ No

Other Sensitive Environments Located Within 4 Miles of the Site:

☐ Yes ☐ No

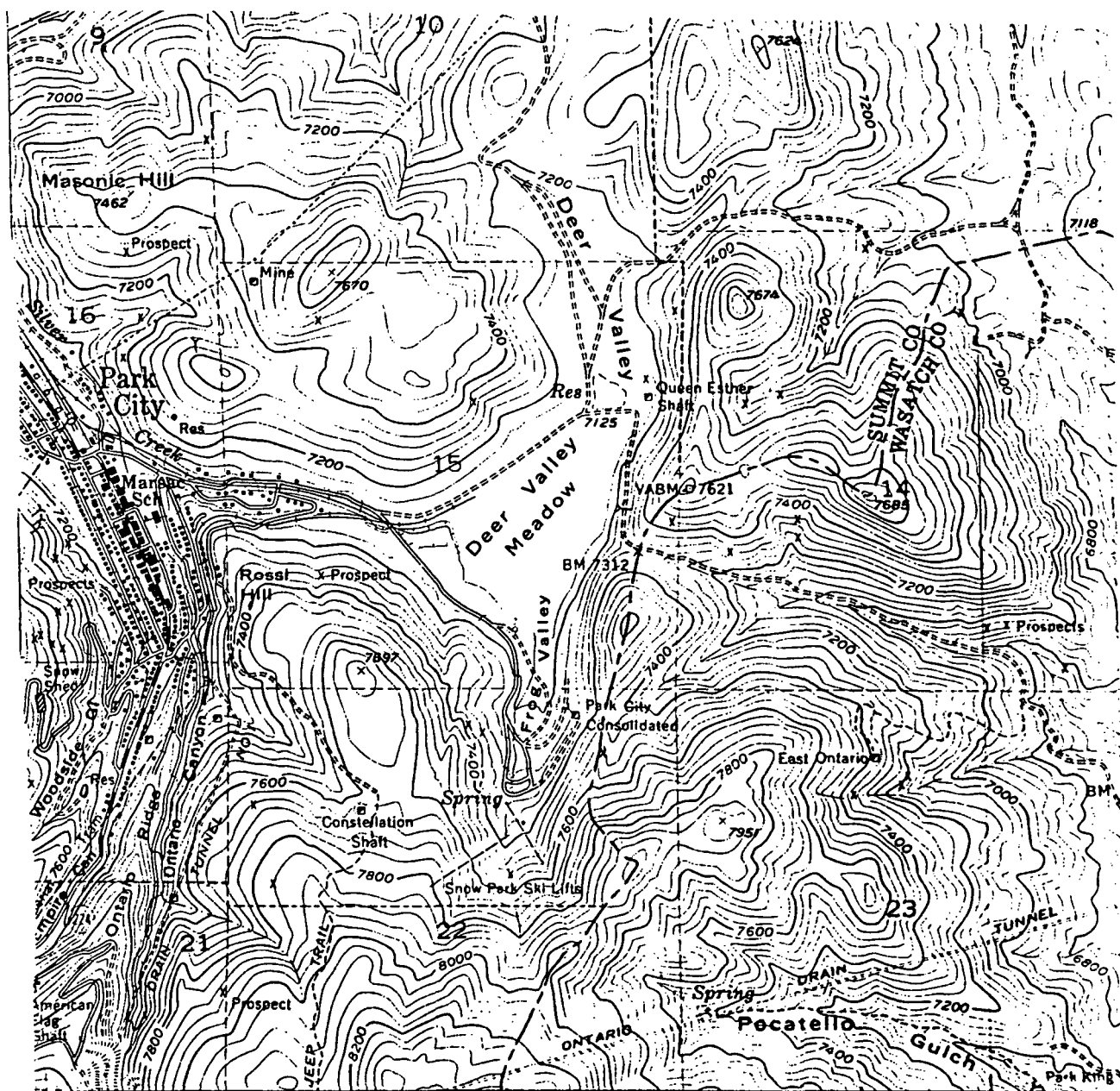
List All Sensitive Environments Within ¼ Mile of the Site:

Distance	Sensitive Environment Type - Wetland Area (Acres)
Onsite	<u>None</u>
0 - ¼ Mile	<u>None</u>
> ¼ - ½ Mile	<u>None</u>

**APPENDIX B.**

Latitude/Longitude Document Record Form for Empire Canyon

# LATITUDE/LONGITUDE DOCUMENT RECORD FORM



SITE NAME: Empire Canyon NUMBER: UT0002005981

MAP NAME: U.S.G.S Park City East, Utah SCALE: 1:24000 DATUM:

COORDINATES OF LOWER RIGHT HAND CORNER OF 2.5 MINUTE GRID

LATITUDE 111° 22' 30" LONGITUDE 40° 37' 30"

**LATITUDE AND LONGITUDE CALCULATION WORKSHEET  
WHEN USING CUSTOM RULER OR COORDINATOR (TM)**

SITE: Empire Canyon NUMBER: UT0002005981  
A.K.A.: Anchor Mine, Daly-West, American Flag, Daly-Judge SSID: \_\_\_\_\_  
ADDRESS: Empire Canyon,  
CITY: Park City STATE: Utah ZIP CODE: 84060  
SITE REFERENCE POINT: \_\_\_\_\_  
TOPO MAP: Park City East TOWNSHIP: T 2 S N/S RANGE: R 4 E E/W  
SCALE: 1:24000 MAP DATE: 1972 SECTION: 21 SE&SW  $\frac{1}{4}$   $\frac{1}{4}$   $\frac{1}{4}$   
MAP DATUM: \_\_\_\_\_ MERIDIAN: Salt Lake

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 7.5' MAP:

LONGITUDE: 40° 37' 30" LATITUDE: 111° 22' 30"

COORDINATES FROM LOWER RIGHT (SOUTHEAST) CORNER OF 2.5' SUB-MAP:

LONGITUDE: 40° 37' 30" LATITUDE: 111° 27' 30"

CALCULATIONS: LATITUDE (7.5 MINUTE QUADRANGLE MAP)

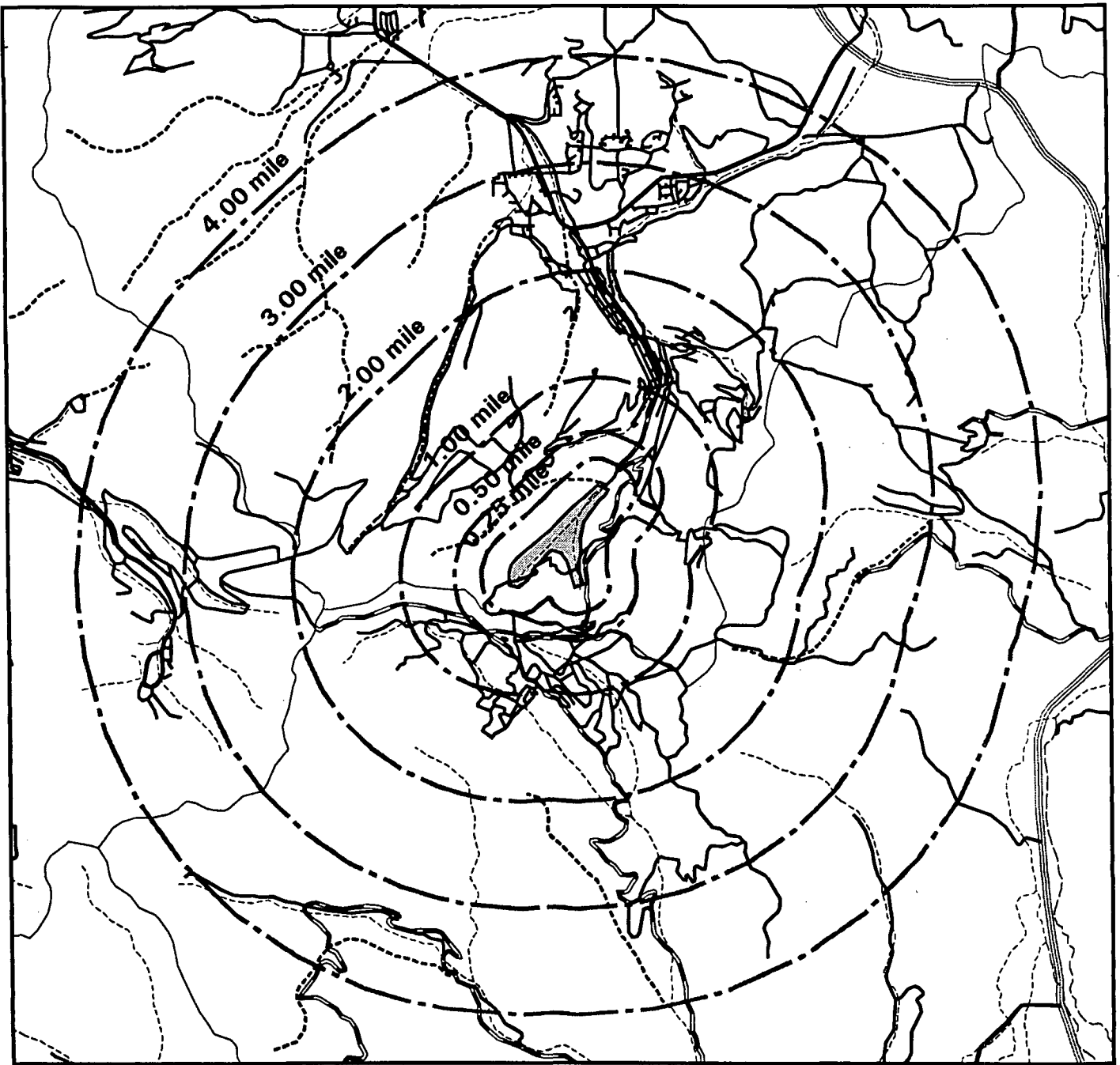
- A) ALIGN THE BOTTOM OF THE SCALE WITH BOTTOM OF GRID. ALIGN THE TOP OF THE SCALE WITH THE TOP OF GRID. POSITION EDGE OF RULER OVER SITE REFERENCE POINT WHILE KEEPING TOP AND BOTTOM ALIGNED.
- B) READ TICS ON RULER AT 1 OR 0.5 SECOND INTERVALS (INTERPOLATE IF POSSIBLE).
- C) RECORD LATITUDE: 111° 29' 38.5" \_\_\_\_\_

CALCULATIONS: LONGITUDE (7.5 MINUTE QUADRANGLE MAP)

- A) ALIGN THE BOTTOM OF THE SCALE WITH RIGHT SIDE OF GRID. ALIGN THE TOP OF THE SCALE WITH THE LEFT SIDE OF GRID. POSITION EDGE OF RULER OVER SITE REFERENCE POINT WHILE KEEPING TOP AND BOTTOM ALIGNED.
- B) READ TICS ON RULER AT 1 SECOND INTERVALS (INTERPOLATE IF POSSIBLE).
- C) RECORD LONGITUDE: 40° 38' 40" \_\_\_\_\_

INVESTIGATOR: Jim Thiros DATE: 10/15/97

**APPENDIX C.**  
**1990 Census Blocks**

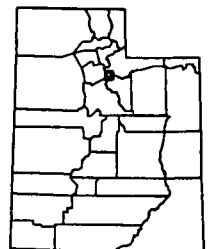


## Empire Canyon Census data

### Legend

	empire		Braided stream		US Highway
	Counties		Canal		County Road
	Stream		Perennial canal		City Street
	Perennial stream		Intermittent canal		c_site_bands
	Intermittent wash		Interstate		

Approximate Scale  
1" = 1.41 Miles



UDEQ

Division of Environmental  
Response and Remediation

Population by Concetric Bands  
Calculated from Census Blocks  
Site Theme: cercla  
Site Name: empire  
Created By: jthiros  
Created On: 09/09/97

TOTAL 0.25 MILE	0.000000
TOTAL 0.50 MILE	0.000000
TOTAL 1.00 MILE	173.000000
TOTAL 2.00 MILE	1,398.000000
TOTAL 3.00 MILE	3,016.000000
TOTAL 4.00 MILE	4,687.000000

**APPENDIX D.**  
**PA Worksheets**

**PRELIMINARY ASSESSMENT WORKSHEET  
FOR  
EMPIRE CANYON, PARK CITY, UTAH**

PREPARER'S NAME: Jim Thiros

SITE NAME: Empire Canyon

DATE: 09/17/97

## MAJOR CONSIDERATIONS

- A) DOES ANY QUALITATIVE OR QUANTITATIVE INFORMATION EXIST THAT MAY INDICATE AN OBSERVED RELEASE TO AIR, GROUNDWATER, SOIL OR SURFACE WATER? Yes

Describe: there are vast amounts of tailings up the canyon.

- B) IF THE ANSWER TO #1 IS YES, IS THERE EVIDENCE OF DRINKING WATER SUPPLY CONTAMINATION OR ANY OTHER TARGET CONTAMINATION (i.e. food chain, recreation areas, or sensitive environments)? Yes

Describe: The public drinking water coming from the Anchor drain tunnel has 8 ppb arsenic in it.

- C) ARE THERE SENSITIVE ENVIRONMENTS WITHIN A 4-MILE RADIUS OR 15 DOWNSTREAM MILES OF THE SITE? X IF YES, DESCRIBE IF ANY OF THE FOLLOWING APPLY:

1) Multiple sensitive environments?

2) Federally designated sensitive environment(s)?

3) Sensitive environment(s) downstream on a small or slow flowing surface water body?  
Silver Creek and it wetlands

- D) IS THE SITE LOCATED IN AN AREA OF KARST TERRAIN? No

Describe:

- E) DOES THE WASTE SOURCE LIE FULLY OR PARTIALLY WITHIN A WELLHEAD PROTECTION AREA AS DESIGNATED ACCORDING TO SECTION 1428 OF THE SAFE DRINKING WATER ACT? X

Describe: Tailings are located on and around the Anchor Mine drain tunnel

- F) DOES ANY QUALITATIVE OR QUANTITATIVE INFORMATION EXIST THAT PEOPLE LIVE OR ATTEND SCHOOL ON ONSITE CONTAMINATED PROPERTY? No

Describe: There are a few home within 200 feet of mine tailings.

## SITE INFORMATION

1. SITE NAME: Empire Canyon

ADDRESS: Empire Canyon

CITY: Park City COUNTY: Summit STATE: Utah

ZIP: 84060 EPA ID: UT0002005981 LATITUDE: 40 37 40 LONGITUDE: 111 30 05

2. DIRECTIONS TO SITE (From nearest public road): Travel south on Main Street in Park City until you reach Empire Canyon road. Go south to the gate across the road this is at the northern part of the site.

3. SITE OWNERSHIP HISTORY (Use additional sheets, if necessary):

A. Name of current owner: United Park City Mines

Address: Ontario Canyon

City: Park City County: Summit

State: Utah Zip: 84060 Dates: From 1950's To pres

Phone: (801)649-6505

B. Name of previous

Address: Daly Group

City: Salt Lake City County: \_\_\_\_\_

State: Utah Zip: \_\_\_\_\_ Dates: From 1920 To 1950's

Phone: \_\_\_\_\_

C. Name of previous owner: American Flag

Address: Unknown

City: \_\_\_\_\_ County: \_\_\_\_\_

State: \_\_\_\_\_ Zip: \_\_\_\_\_ Dates: From \_\_\_\_\_ To \_\_\_\_\_

Phone: \_\_\_\_\_

D. Name of previous owner: Edward P. Ferry (Anchor Mine)

Address: \_\_\_\_\_

City: Park City County: \_\_\_\_\_

State: Utah Zip: 84060 Dates: From 1870 To 1920's

Phone: \_\_\_\_\_

Source of ownership data: Thompson

4. TYPE OF OWNERSHIP (Check all that apply):

☒ Private ☐ State ☐ Municipal ☐ Federal ☐ County  
☐ Other (describe): \_\_\_\_\_

5. NAME OF SITE OPERATOR: United Park City Mines

Address: Ontario Canyon

City: Park City County: Summit

State: Utah Zip: 84060 Phone: (801)649-6505

**BACKGROUND/OPERATING HISTORY**

6. DESCRIBE OPERATING HISTORY OF SITE: Mining in the area started in the 1870's and continued until the 1970's. There were several mills and concentrators in Empire Canyon. One of the Daly mills had 40 hammer stamps. The milled ore was then concentrated, went in to a floatation process, then put in to a Matte, then smelted into low grade bars for further refining in Salt Lake City or the Park City smelter

Source of information: B.S. Butler, USGS pp 111

7. DESCRIBE THE NATURE OF SITE OPERATIONS (property size, manufacturing, waste disposal, storage, etc.): The site is 500 to 750 acres in size. There were several mills and concentrators in the area. The processed ore was dumped off the site of the site and Empire Creek washed a lot of the mine waste down towards the city.

Source of information: B.S. Butler and site visit

8. DESCRIBE ANY EMERGENCY OR REMEDIAL ACTIONS THAT HAVE OCCURRED AT THE SITE:

None

Source of information: \_\_\_\_\_

9. ARE THERE RECORDS OR KNOWLEDGE OF ACCIDENTS OR SPILLS INVOLVING SITE WASTES? \_\_\_\_\_

Describe:

None

Source of information: \_\_\_\_\_

10. DISCUSS EXISTING SAMPLING DATA AND BRIEFLY SUMMARIZE DATA QUALITY (e.g., sample objective, age/comparability, analytical methods, detection limits and QA/QC):

Drinking water samples from the Anchor Mine drain tunnel indicate that elevated levels of arsenic and lead are present.

Source of information: Utah Division of Drinking Water

#### **WASTE CONTAINMENT/HAZARDOUS SUBSTANCE IDENTIFICATION**

11. FOR EACH SOURCE AT THE SITE, SUMMARIZE ON TABLE 1 (attached): 1) Methods of hazardous substance disposal, storage or handling; 2) size/volume/area of all features/structures that might contain hazardous waste; 3) condition/integrity of each storage disposal feature or structure; 4) types of hazardous substances handled.
12. BRIEFLY EXPLAIN HOW WASTE QUANTITY WAS ESTIMATED (e.g., historical records or manifests, permit applications, air photo measurements, etc.): It is difficult to determine how much mine waste is on site, since it is so wide spread and so vast.

Source of information: Site visit

13. DESCRIBE ANY RESTRICTIONS OR BARRIERS ON ACCESSIBILITY TO ONSITE WASTE MATERIALS:

There is a gate across the road at the lower portion of the site. The gate is there to keep motorized vehicles off the site. There is a mountain bike trail across the site as well as several hiking trails. The site is also posted "No Trespassing"

Source of Information: Site Visit

#### **GROUND WATER CHARACTERISTICS**

14. IS THERE ANY POSITIVE OR CIRCUMSTANTIAL EVIDENCE OF A RELEASE TO GROUND WATER? \_\_\_\_\_

Describe: There are large amounts of mine tailings in the canyon drainage.

Source of information: Site Visit

15. ON TABLE 2 (attached), GIVE NAMES, DESCRIPTIONS, AND CHARACTERISTICS OR GEOLOGIC/HYDROGEOLOGIC UNITS UNDERLYING THE SITE.

16. NET PRECIPITATION: 26.64

Source of information: Brough

## SURFACE WATER CHARACTERISTICS

17. ARE THERE SURFACE WATER BODIES WITHIN 2 MILES OF THE SITE? \_\_\_\_\_

       Ditches        X   Lakes             Pond        x   Creeks             Rivers

Other (Describe) \_\_\_\_\_

18. DISCUSS THE PROBABLE SURFACE RUNOFF PATTERNS FROM THE SITE TO SURFACE WATERS:

Drainage from the site would flow into Empire Creek in the bottom of the canyon. The creek runs through the site for its entirety. Tailings are currently located in the creek for most of its length through the site.

19. PROVIDE A SIMPLIFIED SKETCH OF SURFACE RUNOFF AND SURFACE WATER FLOW SYSTEM FOR 15  
DOWNSTREAM MILES (see item #35).

20. IS THERE ANY POSITIVE OR CIRCUMSTANTIAL EVIDENCE OF SURFACE WATER CONTAMINATION? \_\_\_\_\_

Describe: There are visible tailings in the drainage.

Source of information: Site visit

21. ESTIMATE THE SIZE OF THE UPGRADIENT DRAINAGE AREA FROM THE SITE: 1500 acres

Source of information: USGS Quads

22. DETERMINE THE AVERAGE ANNUAL STREAM FLOW OF DOWNSTREAM SURFACE WATERS

Water Body: Silver Creek Flow: 1 - 5.5 cfs

Water Body: Empire Creek Flow: 1 cfs

23. IS THE SITE OR PORTIONS THEREOF LOCATED IN SURFACE WATER? Yes

24. IS THE SITE LOCATED IN A FLOODPLAIN (indicate flood frequency)? Yearly flood plain

25. IDENTIFY AND LOCATE (see item #35) ANY SURFACE WATER RECREATION AREA WITHIN 15 DOWNSTREAM MILES OF THE SITE: There is a city park pond, two miles from the site in Prospector Square.

26. TWO YEAR 24-HOUR RAINFALL: 1.90

Source of information: Brough

## TARGETS

27. DISCUSS GROUND WATER USAGE WITHIN FOUR MILES OF THE SITE:

Source of information: \_\_\_\_\_

28. SUMMARIZE THE POPULATION SERVED BY GROUND WATER ON THE TABLE BELOW:

<u>Distance (Miles)</u>	<u>Population</u>
0 - 1/4	_____
1/4 - 1/2	_____
1/2 - 1	_____
1 - 2	_____
2 - 3	_____
3 - 4	_____

There are 6500 people on a blended City Drinking Water system. There are four systems that are blended together.

Source of information: UDDW

29. IDENTIFY AND LOCATE (see item #35) POPULATION SERVED BY SURFACE WATER INTAKES WITHIN 15 DOWNSTREAM MILES OF THE SITE: None

Source of information: UDDW

30. DESCRIBE AND LOCATE FISHERIES WITHIN 15 DOWNSTREAM MILES OF THE SITE (i.e., provide standing crop of production and acreage, etc.): The Weber River is a Blue Water Fishery that supports trout and whitefish.

Source of information: Utah DNR

31. DETERMINE THE DISTANCE FROM THE SITE TO THE NEAREST OF EACH OF THE FOLLOWING LAND USES

<u>Description</u>	<u>Distance (Miles)</u>
Commercial/Industrial/Institutional	<u>.5</u>
Single Family Residential	<u>.25</u>
Multi-Family Residential	<u>.25</u>
Park	<u>1</u>
Agricultural	<u>1</u>

Source of information: \_\_\_\_\_

32. SUMMARIZE THE POPULATION WITHIN A FOUR-MILE RADIUS OF THE SITE:

<u>Distance (Miles)</u>	<u>Population</u>
0 - 1/4	<u>0</u>
1/4 - 1/2	<u>0</u>
1/2 - 1	<u>178</u>
1 - 2	<u>1,398</u>
2 - 3	<u>3,016</u>
3 - 4	<u>4,687</u>

Source of information: 1990 Census Data

#### OTHER REGULATORY INVOLVEMENT

33. DISCUSS ANY PERMITS:

County: \_\_\_\_\_

State: Utah Division of Oil, Gas, and Mining

Federal: \_\_\_\_\_

Other: \_\_\_\_\_

Source of information: \_\_\_\_\_

35. SURFACE WATER FEATURES

Provide a simplified sketch of the surface runoff and surface water flow system for 15 downstream miles. Include all pertinent features, e.g., intakes, recreation areas, fisheries, gauging stations, etc.

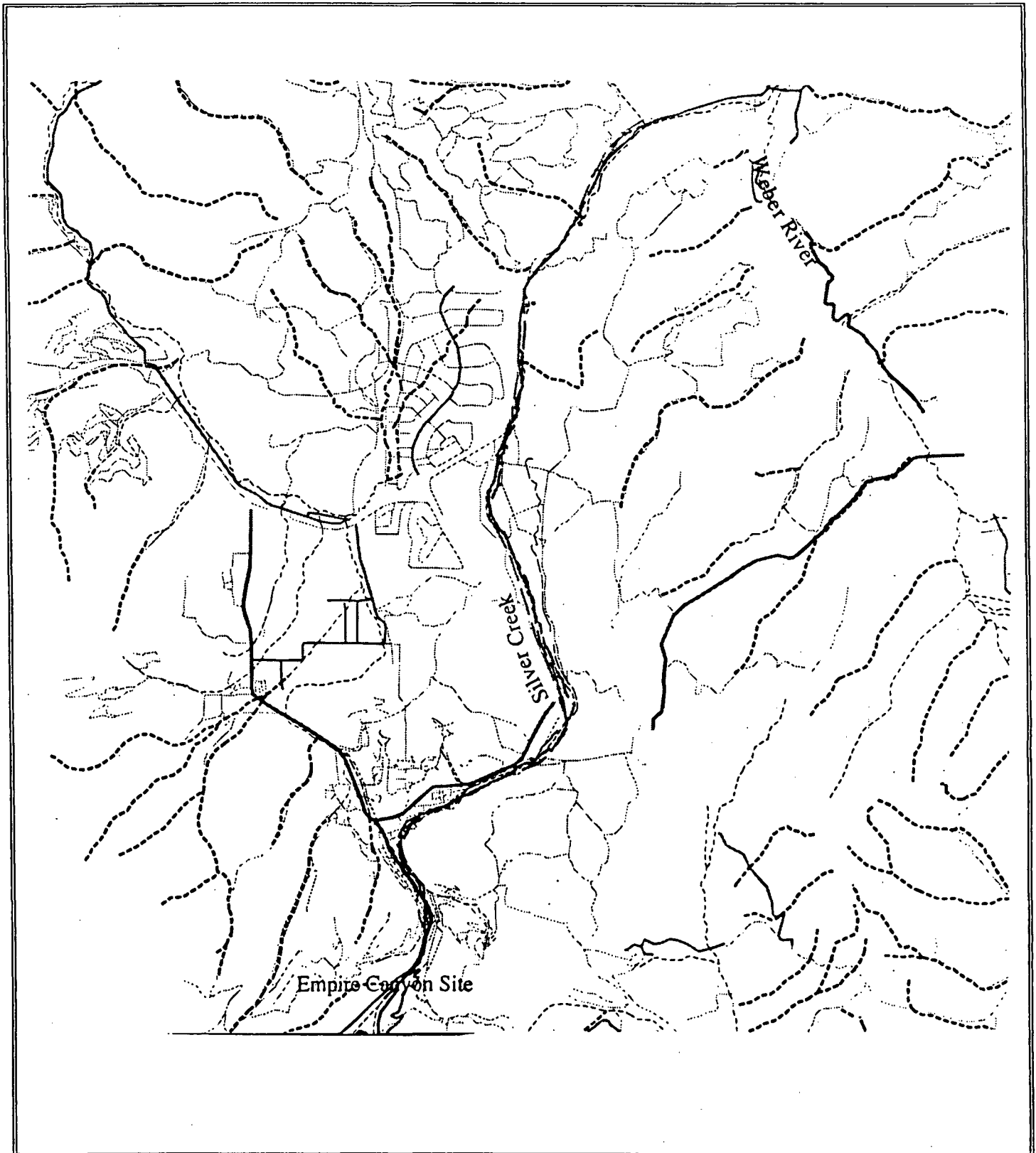


TABLE 1

## WASTE CONTAINMENT AND HAZARDOUS SUBSTANCE IDENTIFICATION \*

SOURCE TYPE	SIZE (Volume/Area)	ESTIMATED WASTE QUANTITY	SPECIFIC COMPOUNDS	CONTAINMENT	SOURCE OF INFORMATION
Mine Tailings		1,000,0000 + tons	Pb, Ag, Cu, As, Ba	None	Site Visit
Slag		100 tons	Pb, Ag, Cu, As, Ba	None	Site Visit
Assay Lab Waste		30 tons	Pb, Ag, Cu, As, Ba	colapsing building	Site Visit
Transformers		4 or 5 Transformers	PCB	Transformers	Site Visit

\* Use additional sheets if necessary.

\*\* Evaluate containment of each source from the perspective of each migration pathway (e.g., ground water pathway - non-existent, natural or synthetic liner, corroding underground storage tank; surface water - inadequate freeboard, corroding bulk tanks; air - unstable slag piles, leaking drums, etc.)

**APPENDIX E.**  
**CERCLA Eligibility Worksheet**

# CERCLA ELIGIBILITY QUESTIONNAIRE

SITE NAME: Empire Canyon

CITY: Park City STATE: Utah

EPA ID NUMBER: UT0002005981

I. CERCLA ELIGIBILITY Yes No

Did the facility cease operation prior to November 19, 1980? X     

If answer YES, STOP, facility is probably a CERCLA site.

If answer is NO, Continue to Part II.

II. RCRA ELIGIBILITY Yes No

Did the Facility file a RCRA Part A application?          

If YES:

1. Does the facility currently have interim status?
2. Did the facility withdraw its Part A application?
3. Is the facility a known or possible protective filer?  
(Facility filed in error).
4. Type of facility:  
Generator      Transporter      Recycler       
TSD (Treatment/Storage/Disposal)

Does the facility have a RCRA operating or post closure permit?          

Is the facility a late (after 11/19/80) or non-filer that has been identified by the EPA or the State? (Facility did not know it needed to file under RCRA).          

If all answers to question in Part II are NO, STOP, the facility is a CERCLA eligible site.

If the answer to #2 or #3 is YES, STOP, the facility is a CERCLA eligible site.

If answer #2 and #3 are NO and any OTHER answer is YES, site is RCRA, continue to Part III.

III. RCRA SITES ELIGIBLE FOR NPL Yes No

Has the facility owner filed for bankruptcy under federal or state laws?          

Has the facility lost RCRA authorization to operate or shown probable unwillingness to carry out corrective action?          

Is the facility a TSD that converted to a generator, transporter or recycler facility after November 19, 1980?          

IV. EXEMPTED SUBSTANCES

Does the release involve hazardous substances other than petroleum?

The site may never reach the NPL. We need to be able to refer it to any other program in EPA or state agencies which may have jurisdiction, and thus be able to effect a cleanup. Responses should summarize available information pertaining to the question.

- 1) Is there an owner or operator?
- 2) (NPDES-CWA) Is there a discharge water containing pollutants with surface water through a point source (pipe, ditch, channel, conduit, etc.)?
- 3) (Sec. 404-CWA) Have fill or dredged material been deposited in a wetland or on the banks of a stream? Is there evidence of heavy equipment operating in ponds, streams or wetlands?
- 4) (UIC-SDWA) Are fluids being disposed of to the subsurface through a well, cesspool, septic system, pit, etc.?
- 5) (TSCA) Is it suspected that there are PCB's on the site which came from a source with greater than 50 ppm PCB's such as oil from electrical transformers or capacitors?
- 6) (FIFRA) Is there a suspected release of pesticides from a pesticide storage site? Are there pesticide containers on site?
- 7) (RCRA - Subtitle D) Is there an owner or operator who is obligated to manage solid waste storage or disposal units under State solid waste or groundwater protection regulations?
- 8) (UST) Is it suspected that there is a leaking underground storage tank containing a product which is a hazardous substance or petroleum?

WORK PLAN

**Empire Canyon**  
Summit County, Utah  
UT0002005981

Utah Department of Environmental Quality  
Division of Environmental Response and Remediation  
Prepared By: Jim L Thiros

Draft: Date 10/31/97 Initials QT  
Revision: Date \_\_\_\_\_ Initials \_\_\_\_\_  
Final: Date \_\_\_\_\_ Initials \_\_\_\_\_

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## **1.0 INTRODUCTION**

The Empire Canyon site is a historic ore processing area located in Park City, Utah. The site is located south of downtown Park City in Empire Canyon. Potential sources of hazardous substances at the site include: soil contamination from past spills of cyanide and acid, buried lagoons, slag material, heavy metals, and abandoned transformers.

Empire Canyon (EC) site is being investigated under a newly instituted Swift Investigation, a streamlined version of the Site Assessment process. The authority to conduct this investigation is derived from the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), as amended under the 1986 Superfund Amendments and Reauthorization Act (SARA), and in accordance with applicable provisions of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The Utah Division of Environmental Response and Remediation (DERR) conducts these activities under a cooperative agreement with the U. S. Environmental Protection Agency, region VIII (EPA). This Work Plan provides for sampling of the Empire Canyon site as part of a Site Inspection in accordance with EPA guidance for activities at CERCLA sites.

## **2.0 OBJECTIVES**

The objectives of this investigation are as follows:

- ▶ Determine presence or absence of hazardous materials sources and evaluate waste quantity and containment.
- ▶ Determine whether nearby surface water is impacted by historical ore smelting, and ore milling practices.
- ▶ Determine whether area soils in the site vicinity are contaminated.
- ▶ Evaluate human health and environmental targets associated with the ground water, surface water, soil exposure and air pathways and determine if these targets are being exposed to contaminants from the historic mining practices of the area.

## **3.0 BACKGROUND INFORMATION**

The scope of this plan involves the collection of approximately 19 samples from hazardous material sources, soil, sediment, and surface water, including quality assurance/quality control (QA/QC) samples, and subsequent laboratory analyses of these samples. Ground water analytical data will be gathered from the Utah Division of Drinking Water, the last round of analytical data from the Park City area was gathered in March 1996. Soil samples will be collected to determine if residents and recreationists are being exposed to contaminated soils. Surface water samples will be collected to assess the impact on Empire Creek. Trip blanks will be collected for quality control purposes. All samples will be analyzed for total metals, with a small number of samples being analyzed for PCB's. The major pathways of concern are the soil, ground water, surface water and air exposure pathways.

### 3.1 Site Location

The EC is located in Empire Canyon just south of Park City. The geographic coordinates for the site are 40°38'40.0" North Latitude and 111°29'38.5" West Longitude (Appendix A). To reach the site, travel east of Salt Lake City on I-80 to the Kimball Junction exit. Travel south on State Road 224 to the downtown area of Park City. Turn right on to Empire Canyon Road and travel south into Empire Canyon. Travel south past the houses until the paved road changes to gravel, which is the north boundary of the site. There were several mills, mines, concentrators, assay office, trams and other mine workings for the next mile up the EC on both sides of the canyon ( Figure 1).

The site is situated on the eastern slope of the Wasatch Range, approximately 25 miles southeast of Salt Lake City. Park City rests at the convergence of Woodside Gulch, and Empire Canyon. These canyons were some of the main ore producing areas of Park City (Figure 1).

### 3.2 Site Description

The total surface area of the site is approximately 500 acres. The site is easily accessible, as no fences or signs are present to limit access to the site. The Tour de Suds Mountain Bike trail goes though the center of the site, and terminates at Guardsman Pass. The EC is bounded by mountains on the north, east, and south, and a Park City residential area is located to the north (Figure 2).

The topographic layout of the Park City district lies between the precipitous cliffs and ledges that mark the main crest of the range and the verdant mountain meadows of Heber, Kamas, and Parleys that lie along the its eastern foothills. Park City is near the Weber/Provo divide which is the most prominent spur on the east slope of the central Wasatch. This divide is also the boundary between Summit and Wasatch counties. The immediate area around the site is one of steep canyon walls covered with tailings and mine overburden, which slope directly into Empire Canyon Creek. The terraces or flat spots in the canyon are the locations of mills assay office power sub-stations, mills and a municipal drinking water tank. There are several other mills and a smelter located in Park City, the reason for the smelters and mills to be located so close to each other in Park City was that there were two grades of ore in the Park City mining district, the higher grade ore went directly to one of the smelters, and the lower grade ore had to be concentrated at the mills before they could be sold or smelted into bars. The Park City mills commonly had slime ponds associated with them, where the heavier fine materials would settle (out of the slimers) to collect the fine concentrates from the floatation process a the mill. The floatation was completed by using a mixture of creosote and pine oil to float the lighter density materials to the surface, and the heavier more precious material would sink to the bottom ( Dagget, Ellsworth).

Tailings from the mine operations are located along the canyon walls as well as in the creek. Several worn trails parallel the creek and traverse the mill and mine sites. The canyon and the creek are popular areas for residents and visitors to hike and bike along. There is a gate across the gravel road up the canyon ½ mile from the nearest homes, but the mountain bike trail starts at that point. The

Empire Creek originates approximately one mile to the south near the Summit/Wasatch County line and near the Daly West Mine and the Anchor Mine drain tunnel.

### 3.3 Site History

In the fall of 1869 the Little Cottonwood Canyon was being over run by miners and mining claims. A few miners ventured outside the Cottonwoods area east over the divide to the narrow gulches of the Parley's Park. The first record of claim in the area was in 1869 by Rufus Walker. The first shipment of ore from the Park City area came in July, 1870, from the Flagstaff Mine (B.S. Butler).

The Thunderer group of claims were originally located in the Empire Canyon in 1898, but was soon purchased by William Curtis and John Rhodin in 1901 and consolidated as the American Flag Company. The Flag, as it was known in Park City, had high gold values right from the start. Each ton of ore produced 700 ounces of silver as well as \$100 of gold. The workings consisted of a double drum hoist with two 60-horsepower boilers. The workings of the Flag were to a depth of 1600 feet before they were flooded with cave-in of the Ontario drain tunnel in 1905. The flooded waters filled the Flag to its 600 foot level. Mining resumed at the shallower depths until the drain tunnel was re-opened when the water levels subsided. Shortly thereafter the Daly group of mines acquired the Flag and its mines which now occupied 360 acres. For a few years ore from the Anchor mine was milled at the Union Mill in Empire Canyon. The Anchor mine soon built it own mill in Empire Canyon. The Anchor was purchased by the Daly group and became the Daly-Judge (Thompson). The Anchor Mine drainage is currently being used as a drinking water supply for Park City. The Union Mill was replaced by the Daly-Judge Mill. The mill was located on the east side of Empire Canyon, on top of the vast tailings pile.

The Mills commonly had to concentrate the ore that was processed at the facility. The early attempts to concentrate the ores were not terribly effective. A floatation process was developed along with a Lixivication process to further concentrate the ore, the process was developed by Russell, a local from Park City. This new process consisted in (1) matting the sulphides in an iron pot, (2) roasting the pulverized matte in a muffle furnace (a small smelter), (3) dissolving the roasted matte in a dilute sulfuric acid solution, (4) crystallizing from the solution bluestone which is used in the mill for preparing Russell's extra solution, (5) washing the silver residue, pressing it into cakes, and melting the dry cakes into bars. The process of Lixivication and Amalgamation were developed in a building near the Marsac Mill that was owned by McKim Concentrating Machines. These processes were patented in February 15, 1876 (B.S. Butler).

## 4.0 SOIL EXPOSURE PATHWAY

### 4.1 Physical Conditions

The 500 acre site is in an area that it is not currently developed, but the property owners are attempting to re-zone the property for residential dwellings. The holdup on the development at this time is access to the site through the narrow residential road in Empire Canyon. The canyon has steep sides that

slope directly into Empire Creek. Most of the area in the canyon that is affected by mine waste is devoid of vegetation. Soils in the immediate area of the mills are discolored with a yellow/orange tint that is nontypical to other soils in the area. There are small amounts of slag at the Anchor and Daly West mines, this slag material may have come from the ore roasting, and casting process at the on-site mills. Many small milling/refining areas were noticed in the Empire canyon wash; tailings in the wash ranged from a couple of inches thick to 6 feet thick. Source/soils range in size from small cobble-sized rocks to very fine silts. At the historic American Flag Mine and Daly-Judge Mine are several transformers that appear to have not been tested for PCB's. These transformers are in a more current maintenance shop. There were no signs on the maintenance shop to keep trespassers out and the doors were either open or missing.

#### 4.2 Soil Targets

Direct exposure to soil contaminated with heavy metals is a pathway of concern. Heavy metals are not only contained within the slag and tailings located on-site, but may also have been released off-site by emissions from the smoke stacks, muffle furnaces, spilling of pregnant sulfuric acid solution, acid air emissions, and un-processed ore. Based on 1990 Census data, there are 4,687 persons living within a four mile radius of the EC site (Appendix B). It is not known how many people use the foot trail and mountain biking trail at the site. Tails are located in the canyon though its entire length from the Anchor mine to where the Empire Creek goes under ground just south of the nearest residential homes.

### 5.0 GROUND WATER PATHWAY

#### 5.1 Hydrogeologic Setting

Ground water at the site occurs in unconsolidated valley fill and consolidated rocks. The unconsolidated valley fill consists of poorly sorted cobbles, gravel, sand, silt, and clay of alluvial origin. The thickness of the unconsolidated valley fill near the site varies from a few feet near the outcrops of consolidated rock to 260 feet at the Pacific Bridge well located near Prospector Square. It is suspected that ground water flows in the same general path as surface water in the area. Therefore ground water flows towards Empire Creek then towards Silver Creek in a northwesterly direction through the Park City area. It is also suspected that ground water in the canyon is several feet below the fill in the bottom of the canyon.

#### 5.2 Ground Water Targets

The nearest municipal ground water wells in the vicinity of EC are the municipal water wells that are on-site. The two drinking water sources on-site that receive water from the Anchor Mine drainage tunnel, which is located in the north portion of EC. There are an additional two more municipal water wells in Thaynes Canyon two miles away. Ground water to surface water migration of contaminants from the site are also possible. Appendix C shows the locations of the 15 public drinking water wells within four miles of EC site (UDDWS, 1991).

## **6.0 SURFACE WATER PATHWAY**

### **6.1 Hydrologic Setting**

The topographic layout of the site and immediate area is multiple terraces and steep mountain slopes. The terraces are generally sloping towards Empire Creek. The creek is immediately adjacent to the mine waste sites in the canyon bottom. Water generally flows down the creek in the spring and early summer months; water also flows down the creek during summer storm events. Run-off from the site flows directly into Empire Creek or soaks into the soil adjacent to the creek. It is unclear how much upgradient run-on water would flow across the site, but the upgradient drainage area that could potentially run over the site is in the 1000's of acres.

Empire Creek flows through the site and joins up with Silver creek 3/4 of one mile below the site. Downgradient of the EC site there are currently 16 Points of Diversion (POD) (Division of Water Rights data base). All POD's have a current designation for irrigation water. At the time of this report there are no known POD's in Silver Creek that have been designated for drinking water purposes.

### **6.2 Surface Water Targets**

There are a number of targets downgradient of the site and adjacent to the site. These targets include; wetlands along Silver Creek, children playing in the water in Empire Creek as well as in Silver Creek, residents that use Silver Creek as an irrigation source, and Silver Creek contribution to the Weber River, which is a blue-water fishery for trout, and whitefish. The drinking water for the Park City area is from ground water sources and from mine drainage tunnels. There are no known downgradient surface water drinking water sources coming from Silver Creek. There are approximately 7 miles of wetland frontage along the 15 mile downgradient migration pathway of Silver Creek and the Weber River (National Wetland Maps).

## **7.0 AIR PATHWAY**

### **7.1 Physical Conditions**

Wind conditions vary for the site depending on the time of year and direction of storms. The slag and discolored soils on-site produce fine dust when strong winds occur and the soil was not wet or frozen. The discolored soil and slag areas on-site are mostly barren and would be the most likely areas for dust to be entrained the air.

### **7.2 Air Targets**

There are 4,687 persons living within 4 miles of the site, which are potential targets for exposure to contaminants in the air (Appendix B). Very fine particles entrained in the normal turbulence of the atmosphere could remain suspended in the air for many days and be carried long distances.

There are approximately 5 acres of wetlands within 4 miles of the site (National Wetlands Map, 1990). The entrainment of contaminated dust in the air could potentially contaminate the wetlands depending on weather conditions and activities at the site.

## **8.0 FIELD PROCEDURES**

### **8.1 Concept of Operations**

#### **8.1.1 Schedule**

The Site Investigation is expected to start in April or May 1998 weather permitting; the sampling event should last two days. Access to the property will be coordinated by the Project Manager. The team members for this sampling plan consist of the following persons:

Project Manager	Jim Thiros
Samplers	Liz Yeomans
	Neil Taylor

#### **8.1.2 Health and Safety**

Level D protective clothing will be worn during the sampling event. Level D may be upgraded to Level C, if dust becomes entrained in the air.

A Site Investigation Health and Safety Plan will be prepared by the Project Manager and reviewed by all team members prior to going on-site. A tailgate safety meeting will be conducted before initiating any work on-site.

#### **8.1.3 Site Access and Logistics**

Provisions for access to sample locations will be arranged by the Project Manager prior to sampling, and landowners will be urged to sign a DERR Consent for Access to Property Form. The landowners will be notified of their rights to obtain split-samples, if requested (Appendix A). Consent for Access forms will be obtained on the day of the sampling and prior to sampling the yards of the nearby residents. Logistical functions will be arranged by the Project Manager.

### **8.2 Sample Locations**

Fourteen soil/source, eight sediment, and eight surface water are planned for the site. Two of the soil samples are opportunity samples. Ground water data from the Utah Division of Drinking Water will be used in the evaluation of the local drinking water supplies. The locations and rationale for the samples are shown in Table 1 and Figure 4.

Soil samples **EC-SO-01** through **EC-SO-08** will be taken in order to delineate areas of potential contamination (Figure 3). Seven source characterization samples (**EC-SC-01** thru **EC-SC-07**) are included in the plan to determine the waste source characteristics of the slag material and mill tailings on-site in the immediate area. These samples may be used for soil near a slag pile or other areas where contamination is believed to be high. One background soil sample (**EC-SO-01**) is planned to determine the background levels of heavy metals in the soil in the area. Sample numbers **EC-SC-08** thru **EC-SC-09** will be used as opportunity samples as wells as for sampling any material that has leaked out of or appeared to have leaked out of transformers in the maintenance shop at the Daly-Judge portion of the site.

Source samples (**EC-SC-01** thru **MM-SC-07**) are included in the plan to determine the waste source characteristics of the slag material and mill tailings on-site and in the immediate area. These samples will be collected in Empire Canyon on the slag, mill tailings, and other areas of visible contamination at the Anchor, Daly-West, and the American Flag operations.

Seven soil samples (**EC-SO-02** thru **EC-SO-08**) will be collected in the area around the historic mining areas as well as in the residential areas below the site. The soil samples will be collected within 1/4 mile of visible mine wastes. Sample locations will be collected in areas that people frequent, nearby residential properties and from areas that would contribute to contaminating the local drainages. Samples **EC-SO-09** and **EC-SO-10** will be opportunity samples. Sample **EC-SO-01** will be the background soil sample to determine the back ground soil conditions in the Park City area; the sample will be collected in an area that would not have been contaminated by the EC operations, and in an area of native vegetation and native soils.

Surface water and sediment samples **EC-SW-01** thru **EC-SW-06** and **EC-SE-01** thru **EC-SE-05**, will be taken to determine if stack emissions and contaminants from the mining activities in the canyon have affected the nearby water bodies. Downstream surface water and sediments samples (**EC-SW-01** and **EC-SE-01**) will be taken downgradient of the site on Silver Creek. Surface water samples will be collected prior to the collection of co-located sediment samples.

One double volume surface water sample (Sample **EC-SW-01**) will be provided for the CLP contract lab internal QA procedures. One duplicate sample (Sample **EC-SW-06**) will be made as similar as possible to the original (**EC-SW-01**) to provide an external laboratory QA check.

Downstream surface water and sediments samples (**EC-SW-02** and **EC-SE-02**) will be taken downgradient of the site on Empire Creek (Figure 3). Surface water samples will be collected prior to the collection of colocated sediment samples.

Upstream surface water and sediments samples (**EC-SW-03** thru and **EC-SE-03**) will be taken on-site, on Empire Creek, near the municipal drinking water tanks (Figure 3). Surface water samples will be collected prior to the collection of colocated sediment samples.

Upstream surface water and sediments samples (**EC-SW-04** and **EC-SE-04**) will be taken downgradient of the Daly west and Anchor mine dumps on Empire (Figure 3). Surface water samples will be collected prior to the collection of colocated sediment samples.

A surface water and sediments samples (**EC-SW-05** and **EC-SE-05**) will be collected in the Walker and Webster Gulch(Figure 3). Surface water samples will be collected prior to the collection of colocated sediment samples.

A duplicate surface water sample will be taken at the same location as **EC-SW-01**. Sample **MM-SW-05** will be taken prior to the collection of the co-located sediment sample (**EC-SE-01**)

If field decontamination becomes necessary, a decontamination blank (Sample **EC-SW-07**) will be collected by pouring de-ionized water over previously decontaminated sampling equipment and collecting the rinsate into a sampling container. This will be used to check the adequacy of the field decontamination procedures.

Sample **EC-SW-08** will serve as the trip blank for the sampling episode. A sample of carbon-filtered deionized water will be prepared before the sampling event which will travel with the other samples and be treated and analyzed as a normal surface water sample. This sample will assess whether the sample containers, preservatives, or field conditions are adding to the contamination levels of all samples.

### 8.3 Sampling Methods

Sampling will proceed according to methods outlined in the DERR CERCLA Quality Assurance Project Plan (QAPP) of November, 1989. Soil samples will be collected with a stainless steel spoon at or near the ground surface. Soil sample depth will be no greater than 24 inches below ground surface. Sediments will be collected with either a stainless steel spoon, dredge, or split spoon sampler. The sediment will be removed from the sampling device and placed into appropriate containers. Downstream samples will be collected first so as not to disturb the water and sediments of later samples.

Surface water will be collected directly into the sample container. Water samples may be tested for pH, temperature, and specific conductivity in the field.

A summary of sample locations and analytical parameters are found on Table 1 and the Sample Analyses Checklist on Table 2.

An adequate quantity of clean sampling equipment and disposable equipment will be supplied in order to avoid the need for field decontamination (Appendix B). If field decontamination becomes necessary, it will proceed according to procedures outlined in the RCRA Ground-Water Monitoring Technical Enforcement Guidance Document (TEGD OSWER-9950.1), and a decontamination blank will be prepared.

### 8.4 Control of Contaminated Materials

Investigation derived waste, although not expected to be generated during the investigation, would be disposed of in accordance with federal and state regulations. Disposable sampling equipment, latex and nitrile gloves, and protective outerwear will be cleaned, bagged, removed from the site, and disposed of as non-hazardous. Excess sample material will be returned to the sample locations. All non-disposable equipment will be decontaminated on-site and decontamination water returned to the site.

## 8.5 Analytical Parameters

Samples will be analyzed for Total Metals and PCB's (Table 2). They will be shipped as environmental samples to a contract lab registered under EPA's Contract Laboratory Program (CLP), and analyzed under Routine Analytical Services (RAS) for the analytes listed in the Sample Analysis Checklist of Table 2. All samples will be preserved by cooling with ice to 4° C. Water samples for metals analysis will also be preserved with nitric acid to a pH less than 2.

## 9.0 FIELD QUALITY CONTROL PROCEDURES

Four Quality Assurance/Quality Control samples will be taken including the following: trip blank, decontamination blank, double volume inorganic, and duplicate sample for surface water. Samples will be handled and preserved as per the DERR QAPP of November, 1989, QA/QC criteria.

### Quality Assurance Samples

Double Volume Inorganic - **Sample EC-SW-01**. One double volume surface water sample will be provided for the CLP contract lab internal QA procedures.

Trip Blank - **Sample EC-SW-08**. A sample of carbon-filtered deionized water will be prepared before the sampling event which will travel with the other samples and be treated and analyzed as a normal surface water sample. This sample will assess whether the sample containers, preservatives, or field conditions are adding to the contamination levels of all samples.

Duplicates - **Sample EC-SW-06**. One duplicate sample will be made as similar as possible to the original, **EC-SW-01**, to provide an external laboratory QA check.

Decontamination Blank - **Sample EC-SW-07**. Carbon-filtered deionized water will be poured over field decontaminated sampling equipment and collected into appropriate containers. This will be used to check the adequacy of the field decontamination procedures.

## 10.0 CHAIN-OF-CUSTODY

Samples will be handled and delivered to the contract lab under strict accordance with chain-of-custody protocol as prescribed by DERR CERCLA QAPP of November, 1989.

## 11.0 DATA REDUCTION, VALIDATION, AND REPORTING

At the completion of sampling event, a Field Activities Report will be drafted outlining and documenting procedures followed during the sampling event. An Analytical Results Report will be sent to EPA Region VIII after receipt of data from the contract lab.

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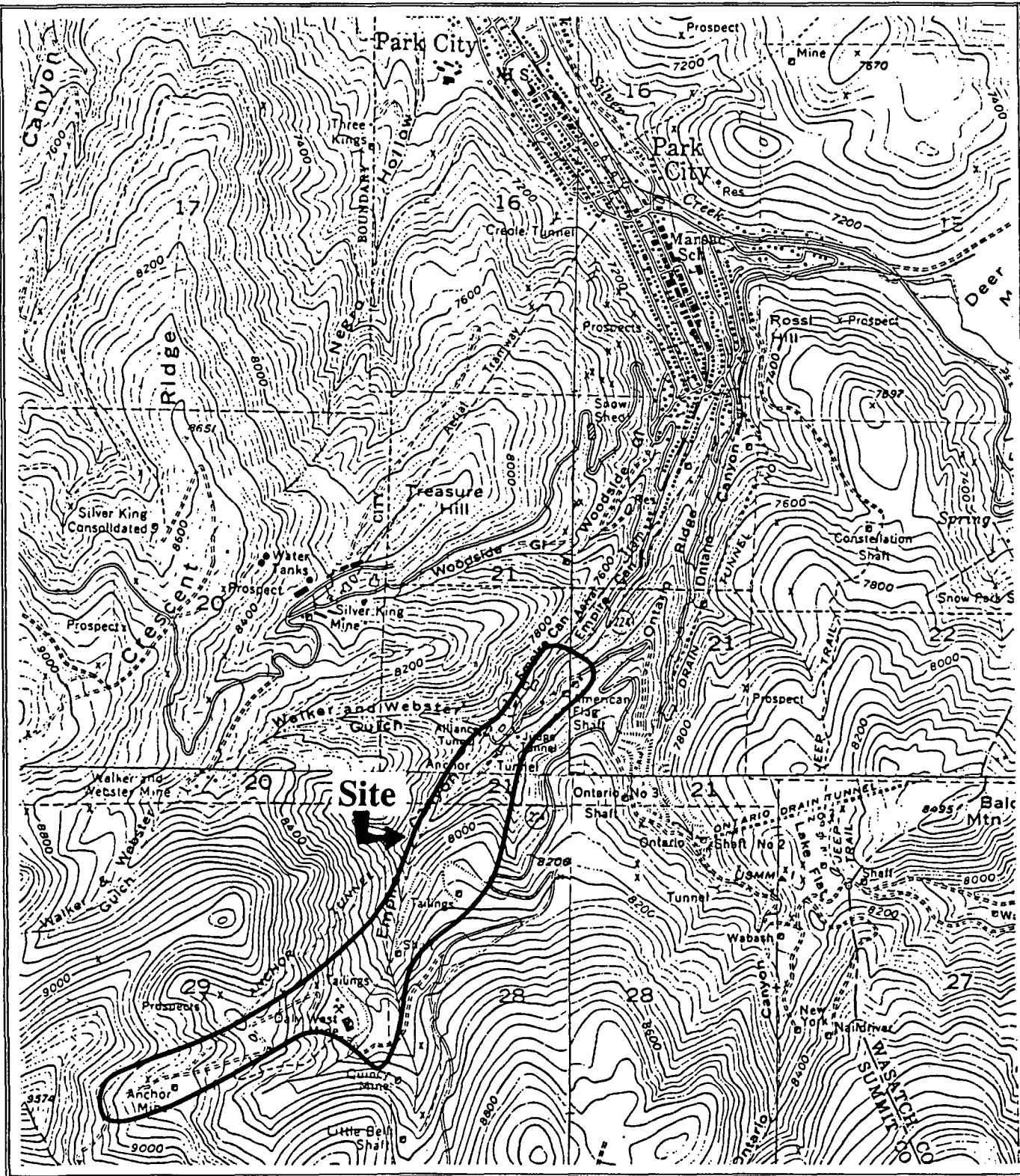
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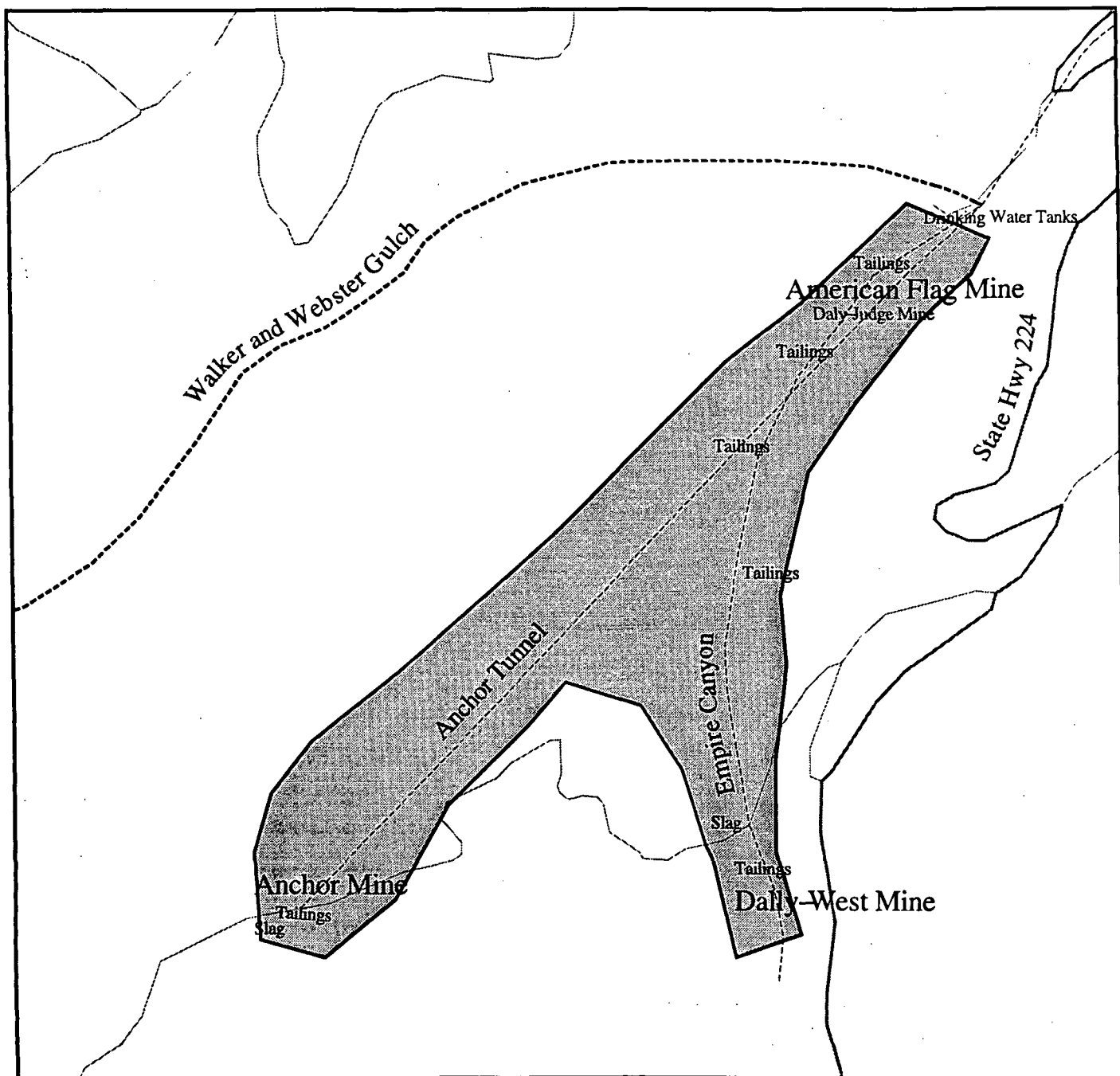
Utah Division of Water Rights, 1991, Water Rights Points of Diversion Listing.



— Site  
 USGS 7.5 Quads  
 Brighton, Utah  
 Heber City, Utah  
 Park City East, Utah  
 Park City West, Utah



DEPARTMENT OF ENVIRONMENTAL QUALITY  
 DIVISION OF ENVIRONMENTAL  
 RESPONSE AND REMEDIATION  
 Empire Canyon  
 FIGURE # 1  
 Area Map

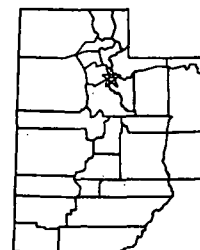


## Empire Canyon Site Location

### Legend

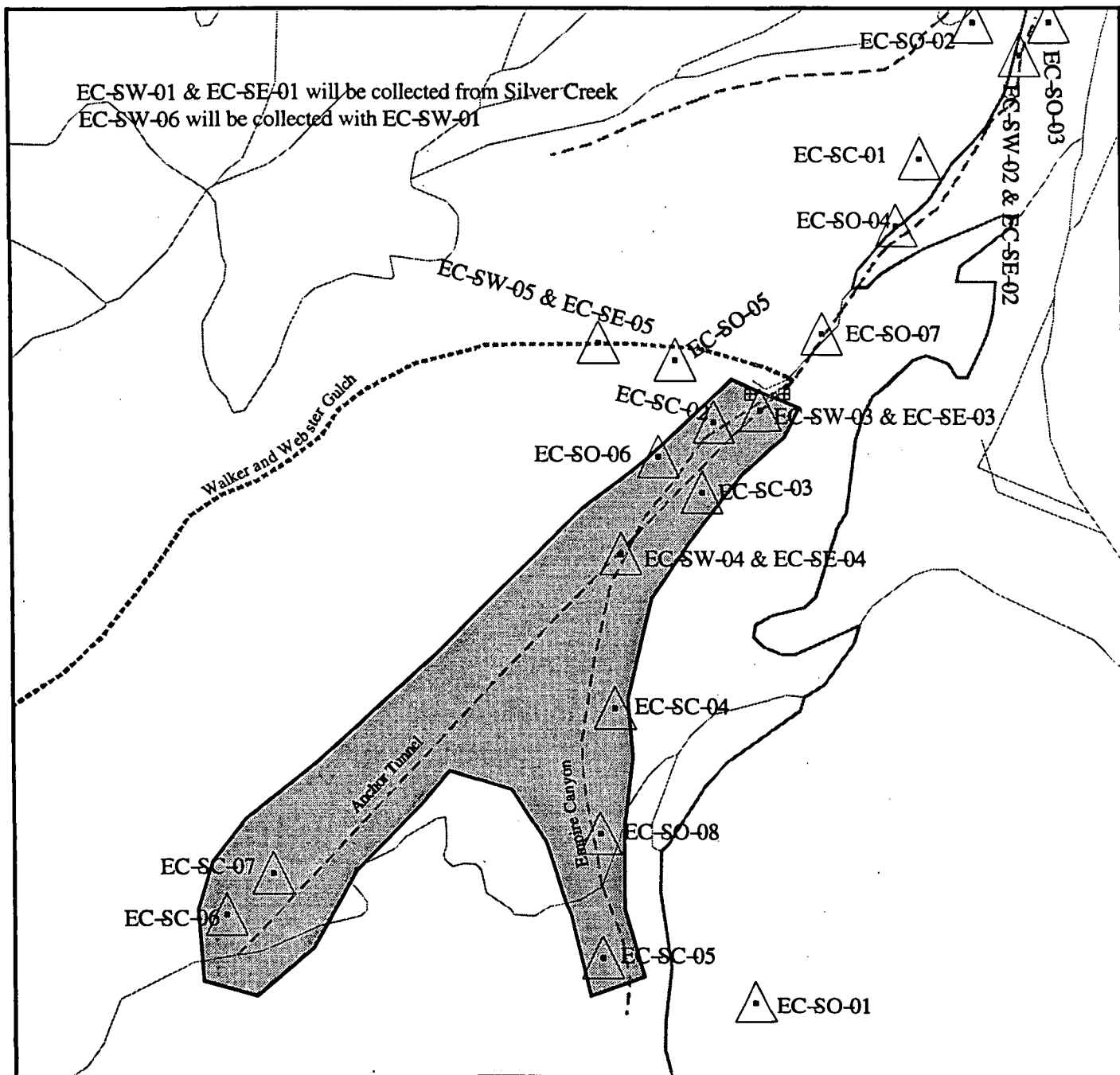
- |               |                                     |
|---------------|-------------------------------------|
| Empire Canyon | Stream                              |
| US Highway    | Perennial stream                    |
| County Road   | Intermittent stream or wash         |
| City Street   | Braided stream                      |
| Jeep Road     | Perennial canal, ditch, or aqueduct |

Approximate Scale  
1" = 0.19 Miles



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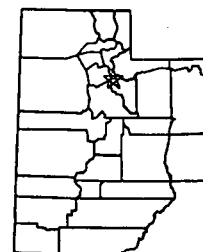


## Empire Canyon Sample Locations

### Legend

- |                        |                     |
|------------------------|---------------------|
| Empire Canyon          | Jeep Road           |
| Drinking Water Sources | Perennial stream    |
| US Highway             | Intermittent stream |
| County Road            | Braided stream      |
| City Street            | Sample Location     |

Approximate Scale  
 1" = 0.24 Miles



UDEQ  
 Division of Environmental  
 Response and Remediation

**Table 1**

**Sample Number, Type Location and Rational**

<u>Matrix</u>	<u>Number</u>	<u>Location</u>	<u>Rationale</u>
Source	EC-SC-01	Empire Canyon	Characterize Mill Tailings
	EC-SC-02	Empire Canyon	Characterize Mill Tailings and for PCB's
	EC-SC-03	Empire Canyon	Characterize Mill Tailings
	EC-SC-04	Empire Canyon	Characterize Slag
	EC-SC-05	Daly-West	Characterize Mill Tailings
	EC-SC-06	Anchor Mine	Characterize Mill Tailings
	EC-SC-07	Anchor Mine	Characterize Slag
	EC-SC-08	Opprotunity	Characterize for PCB's
	EC-SC-09	Opprotunity	Characterize Mill Tailings
Soil	EC-SO-01	Background	Background Soil Sample
	EC-SO-02	Residential	Detect Metals Contamination in Yards
	EC-SO-03	Residential	Detect Metals Contamination in Yards
	EC-SO-04	Road	Detect Metals on Road/Trail in EC
	EC-SO-05	Residential	Detect Metals Contamination
	EC-SO-06	Residential	Detect Metals Contamination
	EC-SO-07	Residential	Detect Metals Contamination
	EC-SO-08	Residential	Detect Metals Contamination
Surface Water	EC-SW-01	Silver Creek	Detect Metals Contamination in Creek
	EC-SW-02	Empire Creek	Detect Metals Contamination in Creek
	EC-SW-03	Empire Creek	Detect Metals Contamination in Creek
	EC-SW-04	Empire Creek	Detect Metals Contamination in Creek
	EC-SW-05	Walker Gulch	Detect Metals Contamination in Creek
	EC-SW-06	Sliver Creek	Detect Metals Contamination in Creek
	EC-SW-07	De-con Sample	To Test Field De-con Procedures
	EC-SW-08	Trip Blank	Trip Blank
Sediment	EC-SE-01	Silver Creek	Detect Metals Contamination in Creek
	EC-SE-02	Empire Creek	Detect Metals Contamination in Creek
	EC-SE-03	Empire Creek	Detect Metals Contamination in Creek
	EC-SE-04	Empire Creek	Detect Metals Contamination in Creek
	EC-SE-05	Empire Creek	Detect Metals Contamination in Creek

## **Table 2**

### **Sample Container Check List**

**1. Surface Water or Ground Water samples:**

Total Metals	1 one liter plastic bottle
--------------	----------------------------

**2. Solids (soil, sediment, etc.):**

Total Metals	1 eight oz. Wide mouth glass jar
--------------	----------------------------------

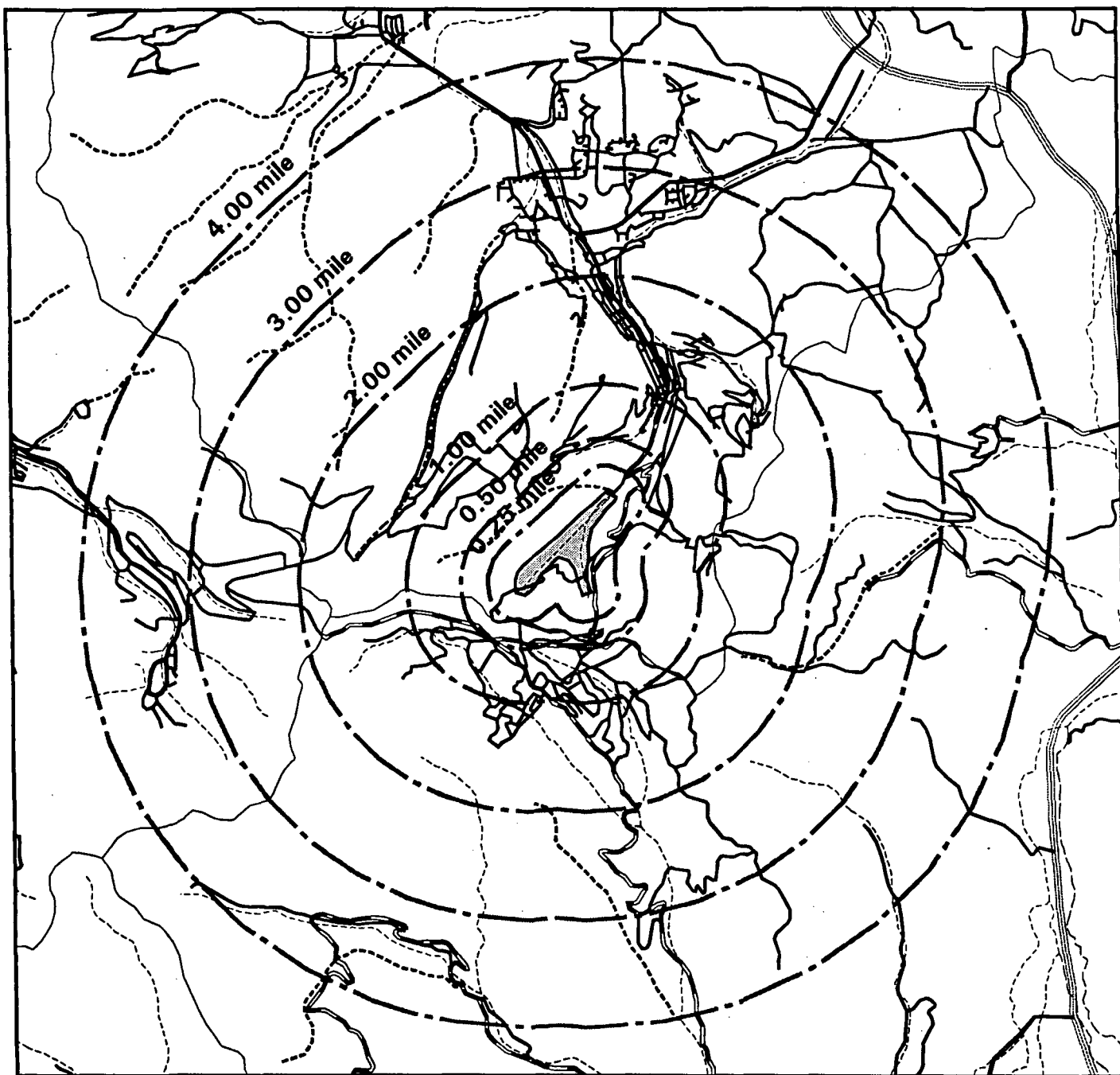
**3. Double Volume Inorganic:**

Total Metals	2 one liter plastic bottles
--------------	-----------------------------

**4. Trip Blank:**

Total Metals	1 one liter plastic bottle
--------------	----------------------------

## **Appendix A**



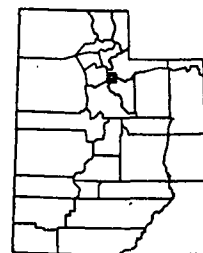
## Empire Canyon Census data

### Legend

	empire		Braided stream		US Highway
	Counties		Canal		County Road
	Stream		Perennial canal		City Street
	Perennial stream		Intermittent canal		c_site_bands
	Intermittent wash		Interstate		

Approximate Scale

1" = 1.41 Miles



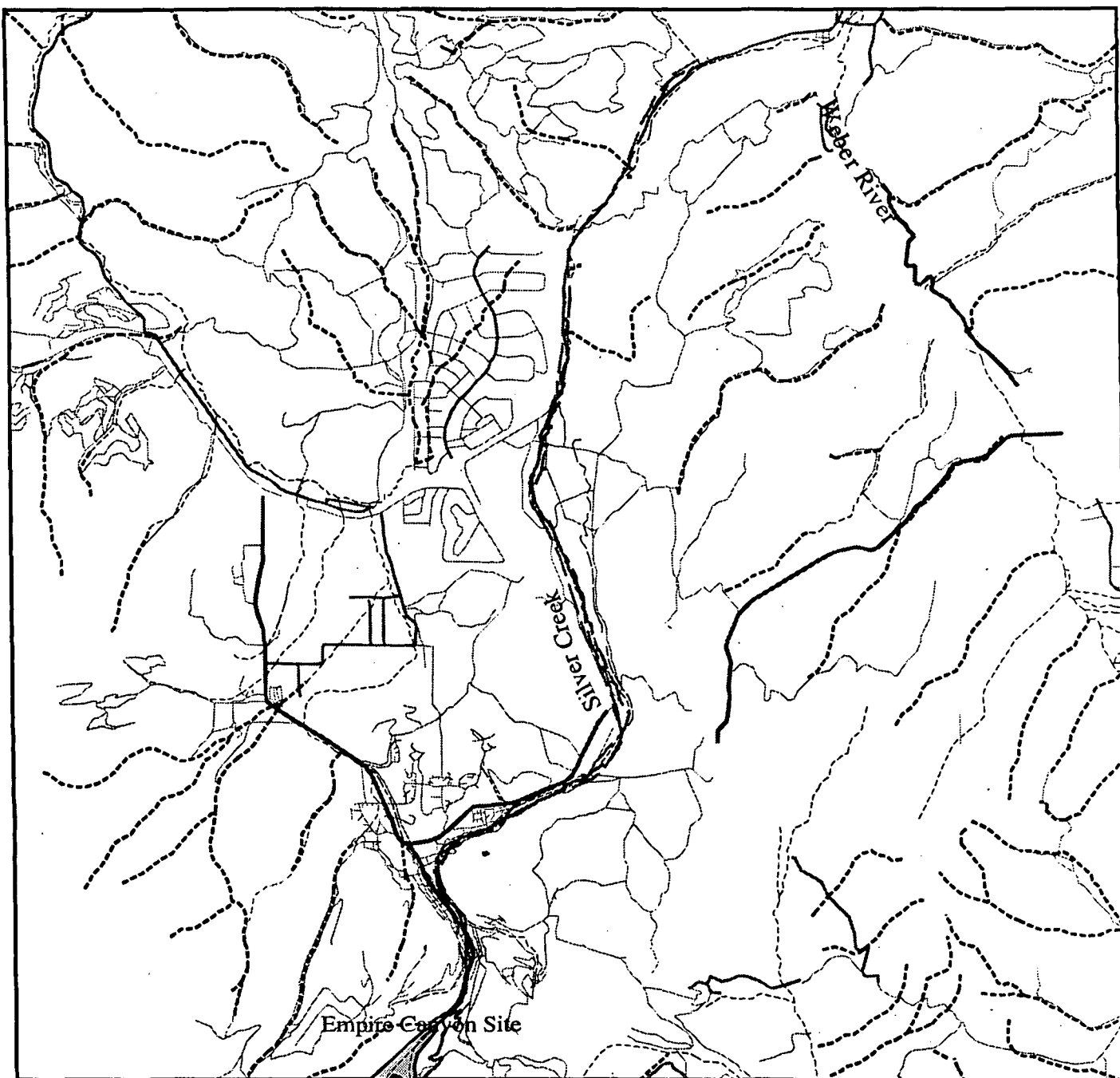
UDEQ

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Response and Remediation

Population by Concetric Bands  
Calculated from Census Blocks  
Site Theme: cercla  
Site Name: empire  
Created By: jthiros  
Created On: 09/09/97

TOTAL 0.25 MILE	0.000000
TOTAL 0.50 MILE	0.000000
TOTAL 1.00 MILE	173.000000
TOTAL 2.00 MILE	1,398.000000
TOTAL 3.00 MILE	3,016.000000
TOTAL 4.00 MILE	4,687.000000

## **Appendix B**



## Empire Canyon

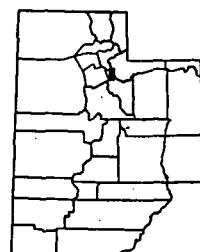
### 15 Mile Downstream Points of Diversion

#### Legend

- |               |                     |                     |
|---------------|---------------------|---------------------|
| Empire Canyon | Stream              | m15_wco             |
| US Highway    | Perennial stream    | Points of Diversion |
| County Road   | Intermittent stream |                     |
| City Street   | Braided stream      |                     |
| Jeep Road     | Perennial canal     |                     |

Approximate Scale

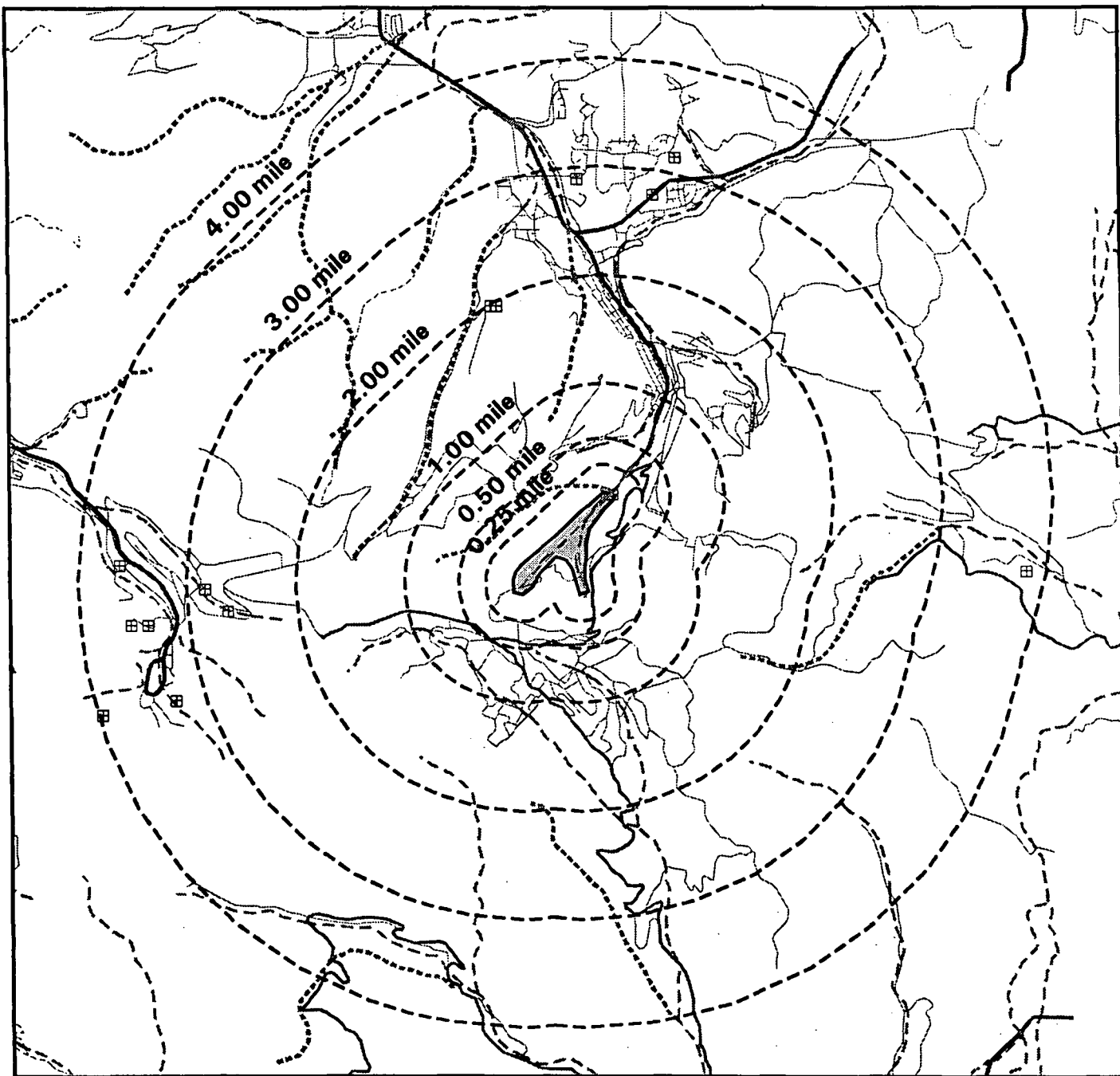
1" = 1.96 Miles



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Division of Environmental  
Response and Remediation

## **Appendix C**

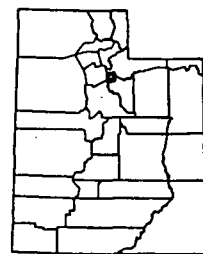


## Empire Canyon Public Drinking Water Wells

### Legend

- |                        |                     |
|------------------------|---------------------|
| Empire Canyon          | Jeep Road           |
| Drinking Water Sources | Perennial stream    |
| US Highway             | Intermittent stream |
| County Road            | Braided stream      |
| City Street            | c_site_bands        |

Approximate Scale  
1" = 1.41 Miles



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Division of Environmental  
Response and Remediation

WATER RIGHTS POD REPORT

Date: October 03, 1997 10:09 AM

WRNUM: 35 4236  
R02//NAME: (1) Bates, F. Ephraim  
R02//CITY: (1) Coalville  
R02//ZIP-CODE: (1) 84017  
TYPE//WRNUM: (1) 35 4236  
TYPE//IRRIGATION: (1)  
TYPE//DOMESTIC: (1)  
TYPE//MUNICIPAL: (1)

WRNUM: 35 4001  
R02//NAME: (1) Bertagnole, Leo M(Inc)  
R02//CITY: (1)  
R02//ZIP-CODE: (1)  
TYPE//WRNUM: (1) 35 4001  
TYPE//IRRIGATION: (1)  
TYPE//DOMESTIC: (1)  
TYPE//MUNICIPAL: (1)

WRNUM: 35 1826  
R02//NAME: (1) Golden West Management Company  
R02//CITY: (1) Salt Lake City  
R02//ZIP-CODE: (1) 84102  
TYPE//WRNUM: (1) 35 1826  
TYPE//IRRIGATION: (1)  
TYPE//DOMESTIC: (1)  
TYPE//MUNICIPAL: (1)

WRNUM: 35 1827  
R02//NAME: (1) Golden West Management Company  
R02//CITY: (1) Salt Lake City  
R02//ZIP-CODE: (1) 84102  
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TYPE//DOMESTIC:(1)  
TYPE//MUNICIPAL:(1)

WRNUM: 35 5478  
R02//NAME:(1) Nordic Construction Company  
R02//CITY:(1) Midvale  
R02//ZIP-CODE:(1) 84047  
TYPE//WRNUM:(1) 35 5478  
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TYPE//MUNICIPAL:(2)

WRNUM: 35 8819  
R02//NAME:(1) Silver King Coalition Mining Co.  
R02//CITY:(1)  
R02//ZIP-CODE:(1)  
TYPE//WRNUM:(1) 35 8819  
TYPE//IRRIGATION:(1) X  
TYPE//DOMESTIC:(1)  
TYPE//MUNICIPAL:(1)

WRNUM: 35 8818  
R02//NAME:(1) Union Lime & Stone Co.  
R02//CITY:(1)  
R02//ZIP-CODE:(1)  
TYPE//WRNUM:(1) 35 8818  
TYPE//IRRIGATION:(1) X  
TYPE//DOMESTIC:(1)  
TYPE//MUNICIPAL:(1)

WRNUM: 35 5828  
R02//NAME:(1) Gillmor, Charles F Jr and Nadine F  
R02//CITY:(1) Salt Lake City  
R02//ZIP-CODE:(1) 84101  
R03//PHONE-NUMBER:(1) 8013648644  
TYPE//WRNUM:(1) 35 5828  
TYPE//IRRIGATION:(1) X  
TYPE//DOMESTIC:(1)  
TYPE//MUNICIPAL:(1)

WRNUM: 35 5706  
R02//NAME:(1) \*\*\*\*\*  
R02//CITY:(1) Park City  
R02//ZIP-CODE:(1) 84060  
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WRNUM:	35 5842
R02//NAME: (1)	Gillmor, Charles F and Nadine F
R02//CITY: (1)	Oakley
R02//ZIP-CODE: (1)	84055
TYPE//WRNUM: (1)	35 5842
TYPE//IRRIGATION: (1)	X
TYPE//DOMESTIC: (1)	
TYPE//MUNICIPAL: (1)	

WRNUM:	35 8820
R02//NAME: (1)	Silver Creek Irrigation Company
R02//NAME: (2)	Gilmor, Florence
R02//NAME: (3)	Pace, Standley and Beverly
R02//NAME: (4)	Pace, Angus T. & Virginia W.
R02//NAME: (5)	*****
R02//NAME: (6)	Silver Creek Investors
R02//NAME: (7)	Gillmor, Charles F and Nadine F
R02//NAME: (8)	Gillmor, Edward Leslie
R02//NAME: (9)	Pace, Arvill and Arlene
R02//CITY: (1)	
R02//CITY: (2)	
R02//CITY: (3)	Park City
R02//CITY: (4)	Wanship
R02//CITY: (5)	Park City
R02//CITY: (6)	
R02//CITY: (7)	Oakley
R02//CITY: (8)	
R02//CITY: (9)	Park City
R02//ZIP-CODE: (1)	
R02//ZIP-CODE: (2)	
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TYPE//MUNICIPAL: (3)	

WRNUM: 35 5478  
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R02//CITY: (1) Midvale  
R02//ZIP-CODE: (1) 84047  
TYPE//WRNUM: (1) 35 5478  
TYPE//WRNUM: (2) 35 5478  
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TYPE//MUNICIPAL: (2)

WRNUM: 35 5463  
R02//NAME: (1) Park City Municipal Corporation  
R02//CITY: (1) Park City  
R02//ZIP-CODE: (1) 84060  
R03//PHONE-NUMBER: (1) 8016499321  
TYPE//WRNUM: (1) 35 5463  
TYPE//WRNUM: (2) 35 5463  
TYPE//WRNUM: (3) 35 5463  
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TYPE//MUNICIPAL: (3)

WRNUM: 35 8825  
R02//NAME: (1) Osguthorpe, D. A.  
R02//CITY: (1) Salt Lake City  
R02//ZIP-CODE: (1) 84116  
R03//PHONE-NUMBER: (1)  
TYPE//WRNUM: (1) 35 8825  
TYPE//WRNUM: (2) 35 8825  
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WRNUM: 35 8824  
R02//NAME: (1) Ontario Silver Mining Co.  
R02//CITY: (1)  
R02//ZIP-CODE: (1)  
TYPE//WRNUM: (1) 35 8824  
TYPE//IRRIGATION: (1) X  
TYPE//DOMESTIC: (1)  
TYPE//MUNICIPAL: (1)

## **Appendix D**

## SITE INSPECTION DATA SUMMARY

Site Name: Empire canyon EPA Region: VIII Date: 09/17/97  
State Office or Contractor Name and Address: Utah Department of Environmental  
Quality, 168 N 1950 W, Salt Lake City, Utah, 84116

### GENERAL SITE INFORMATION

1. CERCLIS ID Number: UT0002005981

Address: Empire Canyon City: Park City

County: Summit State: Ut Zip Code: 84060 Cong. Dist.: 01

2. Owner Name: United Park City Mines

Owner Address: Ontario Canyon City: Park City State: Utah

Operator Name: Same

Operator Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_

3. Type of Ownership (check all that apply):

☒ Private ☐ Municipal ☐ County ☐ State

☐ Federal/Agency Name: \_\_\_\_\_ Other: \_\_\_\_\_

References: \_\_\_\_\_

4. Approximate size of Property: 500 acres.

References: \_\_\_\_\_

5. Latitude: 40 37 40

Longitude: 111 37 05

References: \_\_\_\_\_

6. Status: ☐ Active ☒ Inactive ☐ Unknown

References: \_\_\_\_\_

7. Years of Operation: From: \_\_\_\_\_ To: \_\_\_\_\_

References: 1

8. Previous Investigations:

TYPE	AGENCY/STATE/CONTRACTOR	DATE	References:
_____	<u>None</u>	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

## WASTE SOURCE INFORMATION

**1. Waste source types** (check all that apply):

☐ Constituent      ☒ Wastestream (type): Mine & Mill tailings and slag  
☐ Landfill      ☐ Tanks or non-drum containers (type): Transformers  
☐ Drums      ☐ Pile (type): \_\_\_\_\_  
☒ Contaminated Soil      ☐ Surface Impoundment (buried)  
☐ Land Treatment      ☐ Surface Impoundment (backfilled)  
☐ Other: \_\_\_\_\_

References: Site Visit

**2. Types of wastes** (check all that apply):

☐ Organic Chemicals      ☒ Inorganic Chemicals      ☐ Municipal Wastes  
☐ Pesticides/Herbicides      ☒ Metals      ☐ Solvents  
☐ Radionuclides      ☐ Other: \_\_\_\_\_

References: \_\_\_\_\_

**3. Summarize history of waste disposal operations:**

Wastes from the mining operation were dumped on-site. These wastes include; mine & mill tailings, waste rock, slag, laboratory reagents, creosote, and other mining related wastes.

References: Site PA

**4. Source characterization** (Attach pages to show quantity and calculations):

Source 1 name: Mine & Mill Tailings      Source Type: Pile

Describe Source: 1,000,000 + tons of mine tailings

Ground water migration containment: None

Surface water migration containment: None

Air migration (gas and migration) containment: None

Physical State of Wastes:

☒ Solid    ☐ Liquid    ☐ Sludge/Slurry    ☐ Gas    ☐ Unknown

Constituent Quantity of Hazardous Substances: \_\_\_\_\_ (specify units).

Wastestream Quantity Containing Hazardous Substances: \_\_\_\_\_ (specify units).

Volume of Source (yd<sup>3</sup>): \_\_\_\_\_ Area of Source (ft<sup>2</sup>): 25 acres

Hazardous substances associated with source 1:

<u>Lead</u>	<u>Barium</u>	<u>Copper</u>
<u>Arsenic</u>	<u>Silver</u>	<u>Zinc</u>

References: site visit

Source 2 name: Slag      Source Type: Pile

Describe Source: Slag material from mill smelting of ore flotation matte

Ground water migration containment: None

Surface water migration containment: None

Air migration (gas and migration) containment: None

Physical State of Wastes:

☒ Solid ☐ Liquid ☐ Sludge/Slurry ☐ Gas ☐ Unknown

Constituent Quantity of Hazardous Substances: \_\_\_\_\_ (specify units).

Wastestream Quantity Containing Hazardous Substances: \_\_\_\_\_ (specify units).

Volume of Source (yd<sup>3</sup>): 50 Area of Source (ft<sup>2</sup>): 30,000

Hazardous substances associated with source 2:

Lead Barium Copper

Silver Arsenic Zinc

References: Site Visit

Source 3 name: Transformers Source Type: containers

Describe Source: there are several transformers that may contain PCB's

Ground water migration containment: Inside building (No Doors)

Surface water migration containment: Inside building (No Doors)

Air migration (gas and migration) containment: None

Physical State of Wastes:

☐ Solid ☒ Liquid ☐ Sludge/Slurry ☐ Gas ☐ Unknown

Constituent Quantity of Hazardous Substances: \_\_\_\_\_ (specify units).

Wastestream Quantity Containing Hazardous Substances: \_\_\_\_\_ (specify units).

Volume of Source (yd<sup>3</sup>): 30 gallons Area of Source (ft<sup>2</sup>): \_\_\_\_\_

Hazardous substances associated with source 3:

\_\_\_\_\_ PCB's \_\_\_\_\_

\_\_\_\_\_ \_\_\_\_\_

References: Site Visit

##### 5. Description of removal or remedial activities:

If Removal has occurred, identify the removal authority and describe the activities. Specify the date(s) of the removal.

There have been no removals completed as of this time.

References: DEQ

## GROUND WATER INFORMATION

1. Ground water drinking water use within 4 miles of site sources:

☒ Municipal    ☐ Private    ☐ Both    ☐ No Drinking Water Use

References: \_\_\_\_\_

2. Is ground water contaminated?

☒ Yes    ☐ No    ☐ Uncertain but likely    ☐ Uncertain but not likely  
☐ Additional sampling required

Is analytical evidence available? ☒ Yes    ☐ No

References: UDDW

3. Is ground water contamination attributable to the site?

☒ Yes    ☐ No    ☐ Additional sampling required

References: UDDW

4. Are drinking water wells contaminated?

☒ Yes    ☐ No    ☐ Uncertain but likely    ☐ Uncertain but not likely  
☐ Additional sampling required

Is analytical evidence available? ☒ Yes    ☐ No    References: UDDW

5. Net precipitation (HRS Section 3.1.2.2): 26.64 inches.

6. State average number of persons per residence:

3.2 people.

References: 1990 Census Data

7. Discuss general stratigraphy underlying the site. See attach sketch of stratigraphic column.

Reference: 6

8. Using Table GW-1, summarize geology underlying the site (starting with formation #1 closest to ground surface). Indicate if formation is interconnected with overlying formation.

TABLE GW-1: SITE GEOLOGY

NAME OF FORMATION	INTER-CONNECT? (yes/no)	TYPE OF MATERIAL	AVERAGE THICKNESS (feet)	HYDRAULIC CONDUCTIVITY (cm/sec)	USED FOR DRINKING WATER?
Valley Fill		Sediment	2-260	.1-18	no
Woodside Shale	yes	shale	1180	35	no
Park City Formation	yes	Lime stone	590	.1-50	yes

References: USGS pp111

9. Does a karst aquifer underlie any site source?

X Yes           No The site has many mine shafts and adits.

10. Depth to top of aquifer: 660 feet Ground water in the Anchor tunnel is at the 660 foot mark.

References: Treasure Mountain Home

11. In the table below, enter the number of people obtaining drinking water from wells located within 4 miles of the site. For each aquifer, attach population calculation sheets. Key aquifer to formations listed in Table GW-1.

POPULATION SERVED BY WELLS WITHIN DISTANCE CATEGORIES BY AQUIFER

DISTANCE OF WELL(S) FROM SITE SOURCES	AQUIFER A: INCLUDES FORMATIONS <u>          </u>	AQUIFER B: INCLUDES FORMATIONS <u>          </u>	AQUIFER C: INCLUDES FORMATIONS <u>          </u>
On-site	Park City Formation		
1/2 Mile	Park City Formation		
1.5 Mile	Thaynes formation		

References: UDDW

12. Is ground water from multiple wells blended prior to distribution?

X Yes           No

References: UDDW

13. Is ground water blended with surface water?

     Yes      X No

References: UDDW

Briefly Describe:

14. Distance from any incompletely contained source available to ground water to nearest drinking water well (HRS Section 3.3.1):

0 feet

References: UDDWS

15. Briefly describe standby drinking water wells within 4 miles of sources at the site:

There are currently no standby drinking water wells near the site

References: UDDWS

16. Ground water resources within 4 miles of site sources (HRS Section 3.3.3):

- ☐ Irrigation (5-acre minimum) of commercial food or commercial forage crops.  
☒ Commercial livestock watering.  
☐ Ingredient in commercial food preparation.  
☐ Supply for commercial aquaculture.  
☐ Supply for major or designated water recreation area, excluding drinking water use.  
☐ Water usable for drinking water but no drinking water wells are within 4 miles.  
☐ None of the above.

References: site visit

17. Wellhead protection area (WHPA) within 4 miles of site sources (HRS Section 3.3.4):

- ☐ Source with non-zero containment factor value lies within or above the WHPA.  
☐ Observed ground water contamination attributable to site source(s) lies within the WHPA.  
☒ WHPA lies within 4 miles of site sources.  
☐ None

References: UDDWS

Additional ground water pathway description:

---

## **SURFACE WATER INFORMATION**

**COMPLETE A COPY OF THIS SECTION OF THE DATA SUMMARY FOR EACH WATERSHED**

1. Describe the surface water migration path from site sources to at least 15 miles downstream. Attach a sketch of the surface water migration route.

Surface water from the site would drain into Empire Creek which flows north towards Park City, Utah, where it joins up with Silver Creek. Silver creek flows northeast through town into a city park in Prospector Square. Silver creek then flows through range land and marshes until it reaches the Weber River near the city of Wanship, Utah.

References: USGS Map

2. Is Surface Water Contaminated?

☐ Yes ☐ No ☒ Uncertain but likely ☐ Uncertain but not likely

☐ Additional sampling is required

Is analytical evidence available? ☐ Yes ☐ No

3. Is surface water contamination attributable to the site?

☐ Yes ☐ No ☒ Additional sampling required

4. Floodplain category in which site sources are located (check all that apply):

☒ 1-year ☐ 10-year ☐ 100-year ☐ 500-year ☐ None References: Site Visit

5. Describe flood containment for each source (HRS Section 4.1.2.1.2.2):

Source #1 Tailings, slag Flood Containment None

Source #2 PCB's Flood Containment In Building

References: Site Visit

6. Shortest overland distance to surface water from any source (HRS Section 4.1.2.1.2.1.3):

0 feet

References: Site Visit

7. Size of drainage area (HRS Section 4.4.3):

2500 acres

References: map

8. Describe the predominant soil group within the drainage area (HRS Section 4.1.2.1.2.1.2):

Mountain soils comprised of silts, sands, gravel and cobbles.

References: Site Visit

9. 2-year 24-hour Rainfall (HRS Section 4.1.2.1.2.1.2):

1.9 inches

References: Ashcroft

10. Elevation of the bottom of nearest surface water body:

7700 feet above sea level

References: USGS Map

11. Elevation of top of uppermost aquifer:

7650 feet above sea level

12. Predominant type of water body between probable point of entry to surface water and nearest drinking water intake:

☐ River ☐ Lake ☒ None

References: UDDWS

13. Identify all drinking water intakes, fisheries, and sensitive environments within 15 miles downstream.

TARGET NAME/TYPE	WATER BODY TYPE	Distance FROM PPE	FLOW (CFS)	TARGET CHARACTERISTICS*	TARGET SAMPLED ?
Silver Creek	Creek	2000 ft	1 cfs	wetlands 4 mile	no
Weber River	River	15 mile	200 cfs	fishery 2500 lbs	No

\* If target is a drinking water intake, provide number of people served by intake. If target is a fishery, provide species and annual production of human food chain organisms (pounds per year). If target is a wetland, specify wetland frontage (in miles). Attach calculation pages.

**14. Is surface water drinking water blended prior to distribution?**

☐ Yes ☒ No

References: UDDWS

**15. Describe any standby drinking water intakes within 15 miles downstream:**

None

References: UDDWS

**16. Surface water resources within 15 miles downstream (HRS Section 4.1.2.3.3):**

- ☒ Irrigation (5 acres minimum) of commercial food or commercial forage crops
- ☒ Commercial livestock watering
- ☐ Ingredient in commercial food preparation
- ☒ Major or designated water recreation area, excluding drinking water use
- ☐ Water designated by the state for drinking water use but is not currently used
- ☐ Water usable for drinking water but no drinking water intakes within 15 miles downstream
- ☐ None of the above

References: Site Visit

**SOIL EVALUATION**

**1. Is surficial or soil contamination present at the site?**

☒ Yes ☐ No ☐ Uncertain but likely ☐ Uncertain but not likely

☒ Additional sampling required

Is analytical evidence available? ☐ Yes ☒ No

References: USGS pp111

2. Is surficial or soil contamination attributable to the site?

☒ Yes    ☐ No    ☐ Additional Sampling Required

3. Is surficial contamination on the property and within 200 feet of a residence, school, daycare center, or workplace?

☒ Yes    ☐ No    ☐ Uncertain but likely    ☐ Uncertain but not likely  
☐ Additional sampling required

Is analytical evidence available? ☐ Yes    ☒ No

4. Total area of surficial contamination (HRS Section 5.2.1.2):

1,050,000 square feet

References: Site Visit

5. Attractiveness/accessibility of the areas of observed contamination (HRS Section 5.2.1.1). Check all that apply:

- ☐ Designated recreational area  
☒ Used regularly, or accessible and unique recreational area  
☐ Moderately accessible with some use  
☐ Slightly accessible with some use  
☐ Accessible with no use  
☐ Inaccessible with some use  
☐ Inaccessible with no use

References: Site Visit

6. Population within 1-mile travel distance from site.

DISTANCE FROM SITE SOURCES	POPULATION
one mile	173

References: 1990 Census

### AIR INFORMATION

1. Is air contamination present at the site?

☐ Yes    ☐ No    ☐ Uncertain but likely    ☒ Uncertain but not likely  
☐ Additional sampling required

Is analytical evidence available? ☐ Yes    ☐ No    References: site visit

2. Is air contamination attributable to the site?

☐ Yes    ☐ No    ☐ Additional sampling required

3. Are populations, sensitive environments, or wetlands exposed to airborne hazardous substances released from the site?

☐ Yes ☐ No ☒ Uncertain but likely ☐ Uncertain but not likely  
☐ Additional sampling required

Is analytical evidence available? ☐ Yes ☐ No References: PC Historical

4. Evidence of biogas release from any of the following source types at the site:

☐ Below-ground containers or tanks ☐ Landfill  
☐ Buried surface impoundment

References: \_\_\_\_\_

5. Particulate migration potential factor value: \_\_\_\_\_ (HRS Figure 6-2)

6. Particulate mobility factor value: \_\_\_\_\_ (HRS Figure 6-3)

7. Distance from any incompletely contained source to nearest residence or regularly occupied area:

0 miles

References: Site Visit

8. Population within 4 miles of site sources.

DISTANCE FROM SITE SOURCES	POPULATION
1/4 mile	0
1/2 Mile	0
1 mile	178
2 miles	1,398
3 miles	3,016
4 miles	4,687

References: 1990 Census

9. Resources within 1/4 mile of site sources (HRS Section 6.3.3):

☐ Commercial agriculture  
☐ Commercial silviculture  
☐ Major or designated recreation area  
☒ None of the above

References: Site Visit

10. Sensitive environments and wetlands within 4 miles of the site:

NAME/DESCRIPTION/ LOCATION OF SENSITIVE ENVIRONMENT OR WETLAND	DISTANCE FROM SITE (MILES)	TYPE OF SENSITIVE ENVIRONMENT	WETLAND SIZE (ACRES)
Silver Creek	1 mile	wetland	3

References: Site Visit